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ABSTRACT

This thesis documents an exploratory study of the degree Philosophiae Doctor (Ph.D.). A Ph.D. acquisition model was used as the conceptual framework for the investigation. The model incorporated the three fundamental components of the degree (lengthy study, original research, thesis preparation), which were determined from the historical and regulatory literature. The study sought to answer the question of what effect, either positive or negative, the experts believed altering the fundamental components of the degree Philosophiae Doctor, would most likely have on the resultant degree. Data to answer this question were derived using the prognostic Delphi technique involving a panel of 67 (15 females, 52 males) English-speaking individuals associated with higher education. In Round 1 of the questionnaire study, panelists identified Ph.D. degree-related problems that were validated against the prescriptive literature (1960-1988). Round 2 generated predictive responses about the outcome of 18 hypothetical actions which address the most frequently raised problems in Round 1. A reiterative Round 3 resulted in acceptably stable prognoses for the majority of the responses. The implications of these programs as they relate to the traditional and four non-traditional Ph.D. degrees and to university administrators are discussed. Appendices include the questionnaire and several of the study's components. Contains approximately 250 references. (Author/GLR)

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AN
INTERNATIONAL PROGNOSTIC STUDY, BASED ON AN ACQUISITION MODEL, OF THE DEGREE PHILOSOPHIAE DOCTOR (PH.D.)

by

Keith Allan Noble

U.S. DEPARTMENT OF EDUCATION
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> "After all, Albert Einstein took six years to complete his Ph.D. on the second attempt."

Sir Alwyn Williams [Principal]
University of Glasgow
Graduation Address
1987

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I acknowledge and thank all those listed below; all have helped me with my formal education, and thus, to attain the degree Philosophiae Doctor.

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Dr. Ruth Wright for revealing the relevance of theory to me

DEDICATION

This thesis is dedicated to all those "all but" former candidates; those who completed all the requirements for the doctorate but not the thesis.

ABSTRACT

This thesis documents an exploratory study of the degree Philosophiae Doctor [Ph.D.]. It was prompted by the international existence of several contentious aspects of the degree [appropriateness, attrition, discrimination, employment, program emphasis, research competency evaluation, time to complete, unconventional programs]. Because of the absence of any relevant theory, a model [Ph.D. acquisition model] was utilized as the conceptual framework for the investigation. This model incorporates the three fundamental components of the degree [lengthy study, original research, thesis preparation], which were determined from the historical and regulatory literature.

The research question was, "[w]hat effect, either positive or negative, do experts think altering the fundamental components of the degree Philosophiae Doctor, will most likely have on the resultant degree?" Data to answer this question was derived using the prognostic Delphi technique involving a panel of 67 [15 females, 52 males] English-speaking individuals. These professionals have extensive experience with the Ph.D. degree and they come from Australia, Canada, Great Britain, and the United States. In the Round 1 questionnaire the panelists identified Ph.D. degree related problems that were validated against the prescriptive literature [1960-1988]. Round 2 generated predictive responses about the outcome of 18 hypothetical actions which address the most frequently raised problems in Round 1. A reiterative Round 3 resulted in acceptably stable prognoses for the majority of the responses. The implications of these prognoses, as they relate to the traditional and four non-traditional Ph.D. degrees and to university administrators are discussed.

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I

INTRODUCTION

The purpose of the research recorded in this thesis was an exploratory investigation of the degree Philosophiae Doctor [Ph.D., doctor of philosophy]. More specifically, to study the acquisition process of the degree and to assess what effects hypothetical changes in the process may have on the resultant doctorate. The stimulus for this investigation was the fact that the degree and its current acquisition process are being challenged and criticized on the university campus, in the business community, and within the political realm.

As evidence of this unsettled situation, brief details concerning a number of contentious aspects of the Ph.D. degree are subsequently highlighted. These aspects include appropriateness, attrition, discrimination, employment, program emphasis, research competency evaluation, time to complete, and unconventional programs. They are highlighted because related contentions appear frequently in the higher education literature and press. Whether all the criticism leveled at the doctor of philosophy degree is justified is overridden by its persistent existence, and the criticism is documented without discussion simply as evidence of international disharmony and discontent surrounding this doctorate. References are made to Australia, Canada, Great Britain, and the United States. [Although Great Britain is not an official name, it has been used to avoid possible confusion between the United States and the United Kingdom.] They were selected because their universities have similar academic structures, their Ph.D. degree programs have a common ancestry, and the majority of their doctoral programs are given in the English language.

APPROPRIATENESS. Strong opposition to the Ph.D. degree has been expressed by those who do not consider it an appropriate degree. This opposition has occurred over many years and in a number of countries. Early in this century, James (1903) addressed the proliferation of the doctorate as an undergraduate teaching credential in the United States. He claimed the degree required a narrow specialization, whereas a broad cultural and ethical education would be more suitable for teachers of undergraduate students. Sixty years later, a similar claim was heard in Great Britain when the Robbins Commission (1963) concluded that demanding junior lecturers possess a higher degree before their appointment would be disastrous for that country. Later in Canada, according to Symons and Page (1984, p.29), the requirement that all university professors have a Ph.D. degree resulted in a breakdown of planning and coordination among and between universities and governments in the sixties and seventies. In Australia, respondents in Sekhon's (1989) study offered skeptical comments on the appropriateness of the degree for the business community. Commenting on the Canadian university scene, Cude (1987, p.98) believes the doctorate is overrated by universities, which he claims have a "...fixation on the Ph.D. as the one true certificate for all scholarly functions."

ATTRITION. The attrition of doctoral students appears to be a long-standing concern. Berelson (1960, p.167) quotes Sir Hugh Taylor, the then graduate dean of Princeton University, as saying, "[i]f the graduate schools of the country would solve this problem of attrition...we could raise substantially the output of the graduate schools of the country without increasing enrollment or additional expenditures for faculty and facilities." Ten years later, Rosenhaupt and Pinch (1971, p.121) said that 50 percent of doctoral students fail to complete their programs. Garcia (1987, p.1) cites eight references and claims 23 to 54 percent of all graduate students in the United States fail to complete their studies. In Canada, Cude (1987, p.4) suggests "...thirty percent of [doctoral] candidates admitted in the sciences do not finish their studies, while over fifty percent of candidates admitted in the humanities or social sciences are similarly unsuccessful." In Great Britain, the Society for Research into Higher Education published a text by Rudd (1985) which discusses attrition at length, and the critical relationship between supervisors and students.

DISCRIMINATION. With respect to gender, it is claimed the female experience of obtaining a Ph.D. degree is dissimilar to that experienced by males. This is the result of parental pressures, early school influences, and cultural expectations in the opinion of Centra and Kuykendall (1974, p.1). Discrimination within the university, based on gender (Levy, 1982) and compounded by racial origin (McLean, 1981) is alleged to occur. Writing on women's experiences at the university, Moore (1985, p.84) claims females in graduate school attend programs which are less prestigious and which take longer to finish than those taken by males, and although "...they may receive an equal amount of financial aid, they are still less likely to receive preferred jobs such as research assistantships which support independent study." In a work edited by Vartuli (1982), the common theme is that universities must reconsider their current approach to female students undertaking Ph.D. degrees. Other authors, both female (Thompson and Roberts, 1985) and male (Sternberg, 1981), looking at this situation, see discrimination harming female university students. To help female students overcome discrimination, Phillips and Pugh (1987, pp.131-140) devote a whole chapter, entitled, How to Survive in a Predominantly British, White, Male, Full-Time Academic Environment, in their book on the doctor of philosophy degree.

EMPLOYMENT. For those aspiring to a Ph.D. degree, the opportunity for employment before or after graduating is an issue in higher education. In Canada, Gerson (1989) speaks of a shortage of Ph.D. degree holders, but Zur-Muehlen (1987) believes a faculty supply crisis in the 1990s seems unlikely. In Australia, Maslen (1989) reports an academic staff shortage is imminent. In the United States, it is claimed a shortage will occur in the 1990s (Bowen and Sosa, 1989; Mooney, 1989), and that there will be a demand for over 500,000 new academics during the next 25 years (Bowen and Schuster, 1986, pp.188-200). It is of interest that in the 1970s the concern in Australia (Davies, 1972), Canada (Repo, 1970), and the United States (Chambers, 1976; Wolfe and Kidd, 1971) was the Ph.D. glut, the alarming oversupply of graduates and their subsequent underemployment (Kerr, 1975; Wilcox, 1975).

In Great Britain, research funding cutbacks have created difficulties for would-be academics. Fisher (1987, p.13) states, "[i]f the current crisis does not result in the right environment then perhaps the most sensitive indicator of job strain will be brain drain." At a recent meeting of the Association of Learned Societies in the Social Sciences in Great Britain, a claim was made that "[n]othing in current research training encourages employers [in private industry] to value recruits with Ph.D.s...." (Gold, 1988, p.7), which compounds the problem. Thompson and Roberts (1985, p.2) write, "[t]oday the academic picture is catastrophic for all unemployed and untenured academicians, female and male." It appears future academic employment for Ph.D. degree holders is not guaranteed.

PROGRAM EMPHASIS. In a study of graduate institutions [N=92] in the United States, Berelson (1960, p.290) found that approximately one third of the responding graduate deans believed research was over emphasized in graduate programs. Reporting on rationalisation of research in Canadian universities, Bonneau and Corry (1972, p.58) describe a difference in opinions on what is the appropriate research emphasis for the Ph.D. degree, i.e., essentially a training in research methods, or an effort to scale the upper reaches of the unclimbed peaks of knowledge. Writing on the educational reform of American education, Vandament (1988, p.A52) states that doctoral programs should "...include coverage of educational policy issues, the teaching-learning process, and the history of higher education...." In the United States, Stine (1989) describes the need for doctoral students to undertake practice teaching as part of their programs. Educational reformers in Great Britain are calling for changes to the doctorate, and they advocate taught courses as part of Ph.D. degree programs, similar to North American doctoral programs (Williams, 1988). An Australian document describes how some Ph.D. programs emphasize adult socialisation into a profession, and how this professionalization process is an important part of doctoral education (Hill, Fensham, and Howden, 1974, pp.34–41).

RESEARCH COMPETENCY EVALUATION. Russell G. Hamilton, as graduate school dean of Vanderbilt University is quoted as saying that the dissertation [thesis] is "...the major stumbling block to the Ph.D." (Monaghan, 1989, p.A1). To address this problem, the Council of Graduate Schools commissioned a study (Hamilton et al., 1989) to investigate the role and nature of the doctoral dissertation. Halstead (1987) recommends the research competence of doctoral students be assessed through a series of smaller projects, rather than on the solitary big project or thesis. This is contested by those who believe the whole point of a Ph.D. degree program is the latter. The information services director of the American Anthropological Association is reported by Monaghan (1989, p.A16) to have said, "...one big dissertation is a rite of passage and is the one big test." Other methods of evaluating research competence are now accepted at some institutions. At several universities in the United States, papers published in refereed journals or as chapters in collected works are approved options to the thesis. Other examples of options are the imaginative writing thesis acceptable at the University of Iowa, or a published book at the University of Cambridge. In Great Britain, some institutions have recommended the thesis, considered cumbersome and unnecessary, be abandoned and replaced with courses (Williams, 1988).

TIME TO COMPLETE. Concern is expressed over the time it takes students to complete their Ph.D. degree. British students are now expected to finish in four years or less (Winfield, 1987, p.15). Cambridge has been on a "...blacklist of institutions where E.S.R.C. [Economic and Social Research Council] studentships can no longer be held because fewer than 40 percent of Cambridge's Ph.D. students have managed to complete their degree in the prescribed four year period" (Heron, 1989. p.1); Cambridge has subsequently been removed from this list as a result of improved completion rates (Richards, 1991, p.5). A similar criticism has been made by the Canadian Manufacturers' Association, whose Science and Technology Committee (1986) claims the time taken to complete the doctorate is too long. In an effort to prevent this, the Canadian Association of Graduate Schools has requested universities assist graduate students complete their studies in good time (Maclachlan, 1987). Evangelauf (1989, p.A1) claims that administrators are troubled by the increasing amount of time doctoral students are taking, which "...can deter undergraduates from considering doctoral study, can demoralize those already enrolled in graduate school, and represents an inefficient use of campus resources." The data in Table 1 shows the time to complete a doctorate [includes the Ph.D. degree] in the United States is increasing; in 1987 it ranged from a minimum of 5.8 years, to a maximum of 8.4 years, with a mean for all fields of 6.9 years. Kowalski (1987, p.10) writes there is "...too much

Table 1: Years to complete a doctoral degree in United States*

	1957[1]	1967[2]	1977[2]	1987[2]
Education	5.2	6.2	6.4	7.9
Engineering	4.3	5.2	5.6	**5.8**
Humanities	6.0	5.5	7.1	**8.4**
Life Sciences	4.2	5.4	5.7	6.5
Physical Sciences	4.5	5.1	5.7	6.0
Professional/Other	5.0	5.3	6.1	7.2
Mean for all fields	**5.0**	**5.4**	**6.1**	**6.9**

Source: 1 Berelson (1960, p.158); 2 Coyle and Thurgood (1989, p.31)
* Time from registration to completion [RTD, Registered Time-to-Degree]; Doctoral degree includes the Ph.D. degree plus all other doctorates.

emphasis opon the product rather than the process...." A good supervisory relationship may be critical if the degree is to be completed in a reasonable time (Buckley and Hooley, 1988; Christopherson et al., 1983; Powles, 1988; Young, Fogarty, and McRae, 1987).

UNCONVENTIONAL PROGRAMS. Programs offered in unconventional formats are changing the way students achieve their degree. One which is gathering support is the inter-university Ph.D. program. Where once the student studied at only one university, some new doctoral programs accommodate studies at several institutions. In Canada, Concordia University, McGill University, Université de Montréal, and the Université du Québec are collaborating on a joint doctoral program in administration, and Concordia offers a doctoral program in conjunction with the Nanjing Institute of Technology in the People's Republic of China (Weston, 1988a). This international cooperation, termed jointly-supervised Ph.D.s by the British Council's Committee for International Co-operation in Higher Education (1986, pp.12,13), is well established in Great Britain. [In Europe, COMETT - Community in Education and Training for Technology, and ERASMUS - European Action Scheme for the Mobility of University Students, are two unconventional programs which ensure students can study at several institutions, thereby enriching their research experience (Massué and Schinck, 1987; Scott, 1989).] A contentious development in the United States is one which does not require students to study on campus. Apps (1988, pp.122-145) describes these new and growing operations which include the Electronic University Network [California], and the National Technological University [Colorado]. Another development in the area of unconventional programs is part-time study. Some institutions now permit the attainment of the degree through this method [e.g., Birkbeck College, Great Britain; Walden University, United States]. Traditionally, Ph.D. degree programs have required full-time study.

As revealed in this overview, the requirements for a Ph.D. degree, the acquisition of the degree, and the subsequent activities of graduates, are perturbing to many who have asked questions about the degree and its place in the university. As the world shrinks to McLuhan's global village, as internationalism and global economics exert their irresistable pressures, as universities struggle with budget allocations and increasing societal demands, as knowledge expands exponentially, as communication increases in speed and frequency, and as special interest groups vie for political power, the Ph.D. degree can only reflect the resultant tensions.

Considering the contribution that holders of a doctor of philosophy degree can make to educational institutions, to the gross national product of countries through scientific research and development work, and to the intellectual and cultural life of nations, and noting that the economic, educational, and political realities of the future are international in scope, the responsibilities placed on future Ph.D. graduates may increase greatly. In order to meet these new responsibilities satisfactorily, doctoral students will be required to study different subject matter (Cross, 1987; Jacobson, 1989; Weston, 1988b) and to acquire knowledge in a manner dissimilar to contemporary practices (Barsoux, 1988; Carter, 1980; Stranks, 1984). From the information drawn from the higher education literature and press, as presented above, it is obvious the Ph.D. degree is experiencing the force of change. This degree with its long history could now be subject to irreversible alterations, with unknown consequences. Research into these changes is in the best interests of nations, universities, doctoral students, and the degree itself (Scott, 1988).

In the text he prepared to assist candidates complete their doctorates, Sternberg (1981, p.5) states, "...the dissertation doctorate is certainly the least understood institution in American higher education." It appears that all of the contentious aspects of the Ph.D. degree described above fall around Sternberg's rubric, and it seems logical that his statement applies, without fear of categorical denial, to the higher education scenes in Australia, Canada, and Great Britain.

But, the degree has been in existence for over 700 years, and although aspects of it and the process of its acquisition may be a serious concern and in need of restructuring, the Ph.D. degree is not going to lose its credibility quickly. Scathing attacks of the likes of Sykes (1988), with his belief that Ph.D. holders are causing a demise of higher education, may not bring any changes to the degree even if they are warranted. Russell (1988, p.12) states that the Ph.D. degree has currency in the international marketplace and any attempt to meddle with the attainment process will devalue the degree. To Russell, the increase in the body of knowledge which students must deal with may be the crux of the problem [e.g., Salk (1990. p.vii) lists approximately 116,000 different periodicals in 668 subject areas; in the United States, Gravesande (1990, p.xi) catalogues 854,771 books in print from over 33,000 publishers; in Britain, Whitaker (1990, p.iii) indicates 484,839 titles from 16,168 publishers; and one forecast by the World Organization for the Future of Higher Education is that knowledge will increase by 100 percent between the years 1990 and 2000 (Perica, 1990, p.20).]

Therefore, based on the information as presented, it was concluded that in relation to the Ph.D. degree a problem exists. Although the extent of the problem and the severity of it could not be defined, the volume of criticism suggested the problem was international in scope, and certainly more than superficial in nature. The existence of this problem was the stimulus to undertake a study of the literature related to the degree. This lead to a research proposal incorporating a conceptual framework and methodology, which was subsequently approved, and the results of which are recorded in this thesis.

Chapter II, the literature review, reveals the origin, history, and international spread of the Ph.D. degree, then outlines the regulatory and prescriptive literature in the United States, Canada, Great Britain, and Australia in that order. Chapter III defines the conceptual framework upon which the research was based, and Chapter IV describes the research methodology used. In Chapter V the findings and the analyses are presented. The sixth and final chapter summarizes the research and details the implications of the findings as they relate to traditional and non-traditional Ph.D. degrees and to university administrators.

II

DOCTOR OF PHILOSOPHY DEGREE

History of the University

This research focused specifically on the Ph.D. degree. For a study of this doctorate, it is essential to have an historical appreciation of the university, because the definition of university is, for some, based on the Ph.D. degree. Hence, an overview of the history of the university provides insight into the degree and the factors which have shaped it. Storr (1973, p.45) has drawn from Berelson's (1960) study of graduate education, to show that early in this century the Association of American Universities recorded, "...that what defined a university was the offering of graduate work, and that what completed it, in essence as well as in time, was the granting of Ph.D. degrees." More recently, this has been reaffirmed by Rosovsky (1990, p.137). Therefore, to ensure the doctorate is not reviewed in isolation, an historical overview of the university is an important prologue to the origin, history and international spread of the degree. But first, a caveat is offered with respect to dates, locations, and names. History succumbs to age and falters in its sureness – different sources can give dissimilar data.

Through an edited volume of works, Neilson and Gaffield (1986) address what they believe is a crisis in the contemporary university. The subtitle of their book, **A Mediaeval Institution in the Twenty-First Century**, is telling in that it describes the historical period when the institution was conceived, and that the concept of university as it was formed during the mediaeval period is being transferred into the twenty-first century. The implication of this is that the transferral process is responsible for the crisis they perceive to be taking place in the university. No one can dispute that the mediaeval period, also referred to as the Middle Ages [the period in European history between Antiquity and the Renaissance, often dated from A.D. 476, when Romulus Augustulus, the last emperor of the Western Roman Empire, was deposed, to A.D. 1453, when Constantinople was conquered by the Turks (Morris, 1975, p.830)], gave birth to the concept of the university. Although, as McNeal, Hodysh, and Konrad (1981, p.C11) indicate, "[i]t might be argued that the roots of the university were established in ancient Greece. Among the figures of this earlier period, who contributed to the idea of higher education were Socrates, Plato, and Aristotle." Although Plato [original name Aristocles, 427?-347 B.C.] did pursue his idea of an academy for philosophic discourse on justice and virtue (Shores, 1961, p.42), and although the "...Pythagorean school of Crotona, as far back as 520 B.C., had offered a variety of courses to a united scholastic community..." (Durant, 1939, p.511), the university as it generally exists today in Western society, arose out of the Middle Ages.

At first the institution was called a studium or studium generale, which Coulton (1913, p.651) believes can be traced back to 1133. Over time this term was replaced with universitas, which described one collected body of students and masters. [As an aside, it is interesting to note the term universitas, university in English, has been in use for approximately 800 years without being modified; not until Clark Kerr delivered the Godkin lectures at Harvard University was the term multiversity first heard, the term he coined to describe the changing concept of a university (Kerr, 1963)].

Two higher education institutions which rose to prominence in the Middle Ages were situated at Bologna [Italy] and Paris [France]. Rashdall (1936, pp.19,146,292), identifies these institutions as the original universities, with the university at Bologna forming around 1158, and the university at Paris sometime between 1150 and 1170. Although a school of medicine did exist at Salerno, Coulton (1913, p.651) dismisses this in a footnote, saying Salerno had a studium generale early in the eleventh century "...but it possessed no universitatem beyond a body of Masters, of whose organization very little is known, and whose degree giving powers were for the most part usurped by the state authorities."

Slowly, the university concept spread across Europe. Coulton (1913, p.654) indicates the new institutions modeled themselves upon Bologna or Paris, although Ben-David (1977, pp.23,75) believes a third archetype [Oxbridge] developed later at the universities of Oxford and Cambridge. Some of the earliest universities were established [circa] as follows: 1167 Oxford [England], 1212 Palencia [Spain], 1224 Naples [Italy], 1229 Toulouse [France], 1290 Coimbra [Portugal], 1347 Cologne [Germany], 1364 Cracow [Poland], 1365 Vienna [Austria], 1411 St Andrews [Scotland], 1459 Basel [Switzerland]. The universitas, as Latin was then the language of academe, revealed the existence of national and international students, who throughout Europe were seeking a higher education. By the "...fifteenth century the university was a recognized institution with a concern for its autonomy vis-à-vis papal interference, with a supranational character and with concerns, customs and ceremonies... recognizable in the twentieth century institutions" (Leinster-Mackay, 1977, pp.28,29). As an indication of the magnitude of these developments, there were 10,000 university students in Bologna at the beginning of the thirteenth century (Chambers, 1950, p.570), and the university at Paris was estimated to have had 30,000 students in 1287 (Durant, 1950, p.926). By the early sixteenth century 79 universities had been founded in Europe (Coulton, 1913, p.657).

Certainly the most significant change, which took place after universities were established throughout Europe, resulted from an initiative taken by Humboldt [Friedrich Wilhelm Christian Carl Ferdinand von, 1767-1835] philologian, and educational reformer. His action, initiated in Prussia, altered forever the classical concept of the university. Humboldt's ideal was the research university, an institution where the creation of knowledge was as important as teaching had been in the traditional universities. The stimulus for this development stemmed from Napoleon's military defeat of Prussia in 1806. Smarting over their loss of the university at Halle, which was situated in territory forfeited to Napoleon, the Prussian leaders set out to formulate a new system of higher education which would in turn help rebuild their state. The task of modernizing the older universities and of creating new universities was assigned to Humboldt. As the Prussian minister of education, he founded a university at Berlin [the Royal Frederick William University of] in 1808-1810, the primary objective of which was to create knowledge. At that time research was commonly undertaken by the individual professor, usually in a private research academy, Humboldt brought the two concepts of teaching and research together within the single institution. He wrote, in German, "[i]f the university is restricted to the teaching and dissemination of knowledge, while the academy is assigned its advancement, one obviously does the university an injustice" (Hutchins and Adler, 1969, p.353). To staff the university at Berlin, "...professors were chosen not so much for their ability to teach, as for their reputation or willingness for original research in science or scholarship" (Durant and Durant, 1975, p.607).

This focus on original research was not new. The university at Halle [The Royal Frederick University of], founded in 1694, was the first university to place emphasis on creating knowledge: "...it vowed itself to freedom of thought and teaching, and required no pledge of religious orthodoxy from its faculty; it made room for science and modern philosophy; and, it became a centre of original scholarship and a workshop of scientific research" (Durant and Durant, 1975, p.606). One prominent intellectual founder of the university at Halle was Thomasius [Christian, 1655-1728]. He succeeded in "...bringing science and the universities into the closest connection with the actualities of life, of filling the minds of students with enlightened ideas and useful knowledge in place of the old petrified erudition" (Paulsen, 1908, p.118). He was also responsible for the abandonment of Latin as the language of the university [it was replaced by German], and he worked toward breaking the caste-like culture of the older professorial class.

What Humboldt did was take the example set by Thomasius at Halle, and initiate and legislate this modern university concept into a new higher education system. His successs made Prussian universities regnant institutions which other nations were envious of, and which they proceeded to emulate. To ensure there would be a body of well educated people to staff the civil service, which included secondary school teachers, Humboldt also promoted a mandatory examination, the Staatsexamen, as part of his new educational order (Monroe, 1912, p.341). In these new institutions the teaching of students was considered important, but it no longer was the primary function of the modern university [hereafter modern will be used to describe universities which have research as their primary focus]. In a translation of Humboldt's own words, "[t]he teacher no longer serves the purposes of the student. Instead both serve learning itself" (Hutchins and Adler, 1969, p.350). It should be added that the students referred to were advanced students, in today's terminology graduate students.

Understandably, universities as they were established in North America, and later in the former colonies of European nations, were founded with the same attitudes, beliefs, and customs of European institutions. Many, if not most of the senior university staff had been educated in European universities (Rosenhaupt and Pinch, 1971, p.118), and it was only natural the ideas and initiatives they brought to their positions were influenced by academic traditions and values they acquired in Europe. One good example of the Humboldt model is Johns Hopkins University, the first predominantly graduate institution in North America. Founded in 1876, Johns Hopkins "...had so many German-trained professors that it was referred to as 'Göttingen-in-Baltimore'" (Hutchins and Adler, 1969, p.346). This institution developed a world renowned research reputation, which continues to this day. [In 1988, according to the National Science Foundation (1989), Johns Hopkins received over $509 million in research aid from the United States

Government, more than any other educational institution in that country, and more than twice the second leading recipient, Stanford University].

History of the Doctorate

With this historical review of the university, which in this thesis subsumes college, institute, and school, the doctoral degree, and more specifically the doctor of philosophy degree, will now be reviewed.

Encel (1965, p.7) mentions a Han Chinese literary examination system being promulgated in 165 B.C., and state examinations for public office in China commenced in 140-87 B.C. according to Durant (1935, pp.699,700). Green (1977, p.1230) however, claims that the formal certification of graduates on a continuous basis dates from the ninth and tenth centuries - "Al-Azhar [established in 970] in Egypt and al-Qarawiyin [founded in 859] in Morocco awarded the ijazah, which was a license or diploma. Without the ijazah, no scholar could practise his profession." This qualification cannot be equated directly with the Ph.D. degree, but it does represent the earliest continuous award. Certainly it was the forerunner of the qualifications now conferred in Western universities. It appears that the title doctor, [Latin, *docere* to teach], was first conferred as an honorary title on Peter the Lombard and Gilbert de la Porrée, in Paris in 1145 (Monroe, 1911, p.352). This date, but not the place, is disputed. Green (1977, p.1230) states the first doctorate [possibly in theology] was granted sometime after 1150, and Coulton (1913, p.655) claims the earliest graduation [possibly in canon law] was that of John de Cella in about 1175.

Regardless, it suffices to say the concept of "doctor" was established at the university in Paris, circa 1150. At Bologna a doctorate [possibly in civil law] was conferred sometime after 1158, when the university was granted a charter by Frederick I [also called Barbarossa, 1123?-1190, Holy Roman Emperor 1152-1190]. Because of this charter "...all graduates of Bologna could teach or practice their specialization without further examination" (Green, 1977, p.1230). The doctorate was a permanent license which was recognized and honored by other institutions. According to Monroe (1911, p.352), the jurists at Bologna attempted to arrogate the title doctor, but failed in their endeavours. Slowly, the doctor of canon law, doctor of law, doctor of medicine, and the doctor of theology spread to universities across the continent. Over time, states Durant (1950), the process of acquiring a doctorate became structured, and candidates were required to complete a well defined and demanding academic process:

> Toward the middle of the thirteenth century the custom arose of requiring the student, after five years of resident study, to pass a preliminary examination by a committee of his nation. This involved first a private test - a *responsio* to questions; second, a public disputation in which the candidate defended one or more theses against challengers, and concluded with a summation of the results - *determinatio*. Those who passed preliminary trials were called *baccalarii*, bachelors, and were allowed to serve a master as assistant teacher or "cursory" lecturer. The bachelor might continue his resident studies for three years more; then, if his master thought him fit for the ordeal, he was presented to examiners appointed by the chancellor...if the student passed this public and final examination he became a master or "doctor," and automatically received an ecclesiastically sanctioned license, to teach anywhere in Christendom. As a bachelor he has taught with an uncovered head; now he was crowned with a biretta, received a kiss and a blessing from his master, and, seated in the magisterial chair, gave an inaugural lecture or held an inaugural disputation; this was his *inceptio*...by these and other ceremonies he was received into the magisterial guild (p.929).

Note both Coulton (1913, p.652) and Rait (1912, p.16) state that doctor, professor, and master were synonymous in mediaeval universities, but to this Green (1977, pp.1230,1231) adds, "...the graduates of the lower faculties [grammar, arts] were generally called master, while those of the higher faculties, theology, law, and medicine, were given the title of doctor." Spurr (1970, p.10) adds, "[a]t Paris and later at Oxford, master was the prevailing rank although the term professor was frequently used. At Bologna, the common title was doctor, a usage that spread throughout Italy and into Germany." The current meaning of the word doctor stems from the early Italian universities where the students exercised control [unlike the French universities where the masters were in control], and where they abolished doctoral prerogatives, and the appellation came not to represent an office but merely an honorary title, which subsequently was transformed into an earned degree; whereas the word professor "...has consistently remained a title and has come to signify universally senior rank as a teacher" (Spurr, 1970, p.10).

There should be no doubt the customs were different from university to university, country to country, and century to century. The doctorate provided evidence, as it was usually issued in written form authenticated with the seal of the awarding institution, that the bearer had attained all the rights and privileges attributable to the doctorate. The doctorate allowed the holder to teach at a universitas, although Coulton (1913, p.653) points out that a distinction existed between the teaching doctors, the "legentes," and the "non-legentes," those who took the degree and did not teach. It provided a form of currency which enabled the bearer to travel and to teach at another universitas. But in a very practical sense it provided the holder with a means of deriving an income. A papal bull of 1292 issued by Nicholas IV

[1227-1292] raised the university to new heights and exalted the doctors at Bologna to a level of social prestige previously reserved for priests and knights (Coulton, 1913, p.654). He conferred on them the right of ius ubique docendi, which translated means the right to teach throughout the world. Cobban (1975, pp.26-28) describes it as a license to teach anywhere. But a more base reality was closer to home. Teaching at the universitas had become a monopoly to be enjoyed, and exploited, by those who conferred the doctorate and by those who attained it (Coulton, 1913, p.654).

Approximately 100 years after the first doctorates appeared, the degree Philosophiae Doctor was recorded at the university in Paris circa 1250 (Green, 1977, p.1230), and slowly it was adopted by other European universities. However, it was not until the nineteenth century in German-speaking [Germany did not come into existence until 1871 after the Franco-Prussian war] parts of Europe that the modern Ph.D. degree developed prominence. Undoubtedly, the concept of the degree was shaped through Humboldt's educational reform efforts. In German-speaking universities the "...doctorate gradually replaced the earlier title of Magister, and it became the only recognized degree for the completion of a course of study in the faculty of arts or philosophy" (Lockmiller, 1971, p.31). In an earlier reference the degree is explained as follows:

> This course included the so-called Trivium – grammar, rhetoric, and dialectic [logic], and Quadrivium – music, arithmetic, geometry, astronomy, though the four latter items were never taken very seriously, and by far the most important was the Aristotelian philosophy – hence the ordinary German term of Philosophiae Doctor for Master of Arts" (Coulton, 1913, p.659).

Three significant changes in the Ph.D. degree have occurred since it appeared at the university in Paris, and was "refined" at the university in Berlin. A written thesis has become a requirement for the degree [originally students presented their theses verbally for public disputation (Schachner, 1962, pp.322-330)]; the degree no longer signifies the holder's competence only in philosophy, as it did in earlier years, when the liberal arts faculties were labelled philosophy to distinguish them from the professional faculties of law, medicine, and theology; and finally, whereas the older European Ph.D. degree was bestowed on those considered to be at their intellectual peak, the contemporary degree signifies the holder has acquired the minimum research abilities to commence scholarly investigations.

In a speech, cited in a study of American and German universities conducted by Thwing (1928), a graduate who had received his doctor of philosophy degree in Germany is recorded to have said:

> The scholar is expected, first of all, to think for himself and to develop an independent and critical mastery of whatever subject he may have at hand. Next he is expected to **know all that has been learned** up to his day in respect to this subject, and to this purpose to know and digest the literature pertaining to it. Lastly, by personal contact with the original facts, by seeing for himself, and by examining them by the best methods and in the most thorough way, he is expected to **learn something not yet known**, and thus to **add to the sum of human knowledge**. The great principle upon which the method and details of educational process are grounded is that education should fit a man to do this, in fact render it an inner necessity that he should do it (p.58).

The three key points of this speech are the fundamental components of the Ph.D. degree as required in the ninteenth century in Germany. Students were expected to conduct original research, preceded by and predicated upon a lengthy study of all existing knowledge related to a subject, and to prepare and defend a thesis [subsumes dissertation in this study] which would add to the store of knowledge on the subject. Lockmiller (1971, p.26) describes how candidates had to "...prepare a thesis in Latin and defend it in public against a doctor of their college, selected opponents, and the general public" [the thesis was subsequently published as a book]. These were the fundamental components of the Ph.D. degree that students had to complete when they attended German-speaking universities before the turn of the century.

As the United States was still a very young nation in the nineteenth century, and as a civil war [1861-1865] set the country in turmoil for several years, those wishing to study at an advanced level were compelled to travel to Europe. Although some residual resentment toward England and its educational institutions may have existed after the American Revolution [1775-1783], one primary reason American scholars travelled to Europe, and not to England or Scotland, to undertake graduate level study was that the desired format of this type of study was not available in England or Scotland. For although a D.Sc. [Doctor Scientiarum, doctor of science] degree was available at the University of London from 1860 onwards (Simpson, 1983, p.36) and a D.Phil. [Doctor Philosophiae, doctor of philosophy] degree was described in the official records of the four universities [Aberdeen, Edinburgh, Glasgow, St Andrews] in Scotland in 1895 (Simpson, 1983, p.67), American students preferred to attend universities on the European continent. This fact is clarified by Simpson (1983, p.69) who states, "...a five-year Scottish doctorate compared most unfavourably with the two-year German Ph.D....." Clearly, the number of Americans choosing to study in Europe was high. Thwing (1928, pp.42,43) writes, "[i]t has been estimated that about 10,000 Americans made academic pilgrimages during the nineteenth century and more than half of them studied in the departments of philosophy at German universities...."

By the middle of the nineteenth century, the Ph.D. concept had been introduced to the United States by Americans returning from their studies in Europe. Rosenhaupt and Pinch (1971, p.118) record that the first Ph.D. degree in the United States was awarded as an honorary degree [honoris causa] at Bucknell University in 1852, whereas the first earned Ph.D. degrees were granted to three male students in 1861 by Yale University (Xerox University Microfilms, 1973, pp.864,991,1064). After the founding of Johns Hopkins University in 1876, German-speaking universities were no longer the centre of attention for those living in the United States who were desirous of attaining the Ph.D. degree (Green, 1977, p.1235). Rosenhaupt and Pinch (1971, p.118) have described the requirements for the early Ph.D. degrees in the United States as, "...two years of post-baccalaureate study, a final examination, a thesis, and proficiency in Greek and Latin...."

By the end of the nineteenth century, the components had been strengthened, and two years of resident graduate study, plus a thesis "...embodying the results of original research, bearing the written acceptance of the professor or department in charge" were required (Spurr, 1970, pp.118,119). The Ph.D. degree quickly assumed a very high and desirable level of status, to which students aspired, and which in turn caused some individuals to question the process. Slosson (1910, pp.490-496) said that the doctorate would suffer because of its popularity, and that the financial value of the qualification was becoming inflated. James (1911, pp.329-347) claimed the degree fostered academic snobbery. But, by the beginning of the twentieth century, the Ph.D. degree had almost become a mandatory qualification for professorial appointment at leading universities (Veysey, 1965, p.176). As has been pointed out, the ability to award the Ph.D. degree was at one time the defining factor for what constituted a university in the United States. Harmon (1978, p.1) states that the growth in the numbers of doctor of philosophy degrees conferred has increased at an average of seven percent per year since the degree was first awarded in the United States. Braddock (1987) describes the process of obtaining a Ph.D. degree at a contemporary higher education institution in the United States as follows:

> In general, obtaining a Ph.D. involves 20 or more increasingly specialized courses [may include courses for master's degree], conducting research on a very narrow subject, and writing a dissertation that describes the research and its results. The course work usually takes several years to complete even though it is equivalent to three years of academic credit. Classes are usually smaller than undergraduate classes and seminars are common. Typically, students must study articles in scholarly journals as well as textbooks; research papers are usually required. Graduate students have closer contact with their professors and other students in their departments than do undergraduates, but usually have less contact with other parts of university life. They tend to live off campus, are often married, and, in many cases, have jobs or assistantship duties in addition to their studies (p.2).

Originally promoted by Humboldt as a way of generating knowledge and educating state employees, the Ph.D. degree in the United States has become associated with other needs. The Council of Graduate Schools (1977, p.1) states that the degree is "...designed to prepare a student for a lifetime of intellectual inquiry that manifests itself in creative scholarship and research, often leading to careers in social, governmental, business, and industrial organizations as well as the more traditional career in university and college teaching."

Four significant developments related to the Ph.D. degree have occurred in the United States. These developments have influenced, to varying extents, the Ph.D. degrees offered in Australia, Canada, and Great Britain. First, with respect to the requirement that the thesis be published, the thesis has, historically, always been broadcast in some form. According to Durant (1957, p.341), "[t]he practise of announcing theses, which the proponent offered to defend against all challenges...," was an established procedure in mediaeval universities. It was the same custom that compelled Luther to nail his 95 theses to the door of a Wittenberg church, in 1517. Rosenhaupt and Pinch (1971, p.120) point out that until the 1930s in the United States all theses had to be printed for dissemination purposes, but during the mid-1950s this requirement began to be replaced by microfilming.

The second development was the widespread granting of the Ph.D. degree to women. Leading up to this development was the conferral of degrees, described as "first degrees," on 11 women attending Georgia Female College in 1840, and subsequently, the first female to qualify for a Ph.D. degree in a modern institution received her doctorate from Boston University in 1877 (Lockmiller, 1971, pp.29,30). Since then the number of female Ph.D. graduates has risen from approximately nine percent of total Ph.D. graduates in the period 1900-1904, to 20.5 percent in 1974 (Harmon, 1978, p.17), to 36.5 percent in 1989 (Thurgood and Weinman, 1990, p.6). By the year 2001 in the United States, it is projected that more females than males will graduate with Ph.D. degrees (Hodges, 1991, p.11). It is noteworthy that in the thirteenth century there were women students at Italian universities, and in the fourteenth century the university at Bologna had female professors (Durant, 1950, p.917) but the exact details of their qualifications are unrecorded.

The third development was related to the requirement of competence in a second [or third] language. This historical requirement has lost support over several decades. Originally, the candidate was expected to know both Greek and Latin, which were later replaced by French and German. Subsequently, fluency was replaced by a reading knowledge of both, then proficiency in one, and finally to today, where research related courses are an acceptable option (Rosenhaupt and Pinch, 1971, p.120). In a study of administrators [N=227] at accredited Ph.D. granting institutions in the United States, Graves (1983, p.38) found 53.6 percent believed a foreign language should be a requirement for all graduate degrees. However, the majority dismissed a return to French and German and approved other languages, e.g., Russian.

Professionalization is the fourth development. In German-speaking universities the practice of identifying the Ph.D. as a research degree was clearly established. It was viewed differently, and necessitated different qualifying requirements, from the degrees connected with the professions of law, medicine, and theology. However, in the United States unique conditions produced a change in focus. In his work on graduate education, Walters (1965, p.4) describes how early "[f]rontier conditions had moulded the American people into a primarily practical-minded people, and instruction in industrial, mechanical, and agricultural arts began to be demanded." Hand-in-hand with this was the need of the developing professions to have an adequate and constant number of qualified graduates to execute the responsibilities of these professions, and to foster research which would further their practice (Mayhew, 1977, p.1907). The new reality and demands of a developing nation strained the old and traditional concept of the Ph.D. degree. Dewey (1917, p.31) saw a conflict between a "...technical and specialized training on the one hand..." and the educational endeavour "...to live in the past by way of inviting the soul of our youth to a leisurely and liberal culture." Although Humboldt promoted the Ph.D. degree to create academic scholars and scientists [which is in reality, as Bent (1959) suggests, training for a profession], this doctorate is now available in an array of professional subjects, e.g., "...accounting, animal science, home economics, education, German, nursing, nuclear engineering, physical education, veterinary pathology, and zoology" (Walters, 1965, p.viii). Table 2 shows the more distinctly professional doctoral degrees now available in the United States.

Two points encompass the historical development of the Ph.D. degree in the United States. 1. Refinement: e.g., standardization of quality, elimination of the honorary degree appellation, prolongation and intensification of the study period; 2. Expansion: e.g., equal acceptance of females and the option of a wide range of academic subjects. For Scott (1984, p.3), the Ph.D. degree was introduced "...to wean wealthy Americans off the universities of Germany." The fact 377 institutions in the United States now offer a doctoral degree (Thurgood and Weinman, 1990, pp.80-85) attests to success.

Table 2: Doctoral degrees offered in United States [1989]

D.A.	Doctor of Arts	D.Min./ D.M.	Doctor of Ministry
D.A.S.	Doctor of Applied Science	D.M.L.	Doctor of Modern Languages
D.Arch.	Doctor of Architecture	D.M.	Doctor of Music
D.B.A.	Doctor of Business Administration	D.M.A.	Doctor of Music Arts
J.C.D.	Doctor of Canon Law	D.M.E.	Doctor of Music Education
D.Chem.	Doctor of Chemistry	D.M.M.	Doctor of Music Ministry
D.C.L.	Doctor of Comparative Law / Civil Law	D.N.Sc.	Doctor of Nursing Science
D.C.J.	Doctor of Criminal Justice	Ph.D.	Doctor of Philosophy
D.Crim.	Doctor of Criminology	D.P.E.	Doctor of Physical Education
Dr.Des.	Doctor of Design	D.P.S.	Doctor of Professional Studies
Ed.D.	Doctor of Education	D.P.A.	Doctor of Public Administration
D.Env.	Doctor of Environment	D.P.H.	Doctor of Public Health
D.E.D.	Doctor of Environmental Design	D.Rec./ D.R.	Doctor of Recreation
D.Eng.	Doctor of Engineering	Rh.D.	Doctor of Rehabilitation
D.E.Sc./ Sc.D.E.	Doctor of Engineering Science	D.R.E.	Doctor of Religious Education
D.F.A.	Doctor of Fine Arts	D.S.M.	Doctor of Sacred Music
D.F.	Doctor of Forestry	S.T.D.	Doctor of Sacred Theology
D.G.S.	Doctor of Geological Science	D.Sc./ Sc.D.	Doctor of Science
D.H.S.	Doctor of Health and Safety	D.Sc.H.	Doctor of Science and Hygiene
D.H.L.	Doctor of Hebrew Literature/Letters	D.Sc.D.	Doctor of Science in Dentristry
D.I.T.	Doctor of Industrial Technology	D.Sc.V.M.	Doctor of Science in Veterinary Medicine
S.J.D.	Doctor of Juridical Science	L.Sc.D.	Doctor of Science of Law
J.S.D.	Doctor of Juristic Science	D.S.Sc.	Doctor of Social Science
D.L.S.	Doctor of Library Science	D.S.W.	Doctor of Social Work
D.M.Sc.	Doctor of Medical Science	Th.D.	Doctor of Theology

Source: Thurgood and Weinman (1990:113)

To the north in Canada, the foundation for a Ph.D. degree was slowly being laid. Similar to the Americans, Canadians had been attracted by the universities across the Atlantic. Ross (1975, p.197) claims that "[d]uring the 1870s Canadians who were concerned about improving higher education looked to Europe for inspiration." But by the end of the nineteenth century the universities in Britain had lost their appeal, due to their inability to provide the desired research oriented graduate education. It was stated by Young (1903, p.7) that "...Oxford has ceased to be the intellectual centre of the Empire...," whereas the German university system retained its revered position. In an article cited by Ross (1975, p.197), and which appeared in an 1880 edition of the University of Toronto newspaper **Varsity**, a correspondent wrote, "...both in the quantity and quality of her original scientific work, Germany has far outstripped any other nation," to emphasize the point that German universities were highly regarded.

Canadians who had completed a Ph.D. degree out of the country, returned home and took up the task of upgrading graduate education in their own institutions. Toward the end of the nineteenth century interest in continental European universities began to wane, although not completely, as increased attention was being given to the developments taking place to the south in the the United States (Adams, 1887; Gordy, 1891). According to Mayhew (1977, p.1913), "...Canadian professors encouraged their more able students to migrate to the United States for graduate work...." Over time, a small number of Canadian graduates returned from the United States and began to suggest doctoral programs be established in Canada. One returning student extolled the benefits of graduate education in the United States, and urged the University of Toronto to introduce a similar program (Hunter, 1880). Slowly, educational nationalism became a rallying cry. In his history of higher education in Canada, Harris (1976, p.187) writes that "[t]he 1890-91 calendars of three Canadian universities, Mount Allison, New Brunswick, and Queen's outline a program for the Ph.D.." He points out that the same Mount Allison calendar records two doctor of philosophy degrees being granted, but it appears that in both cases the recipients were staff who received the degrees as honorary titles. Drawing on these developments and following the lead of the establishment of Johns Hopkins University [1876] and the University of Chicago [1891], both of which were modern universities, having research as their raison d'être, educational reformers at the University of Toronto began to push for the adoption of the Ph.D. degree. But Canadian students continued to leave their country to undertake graduate study in the United States, and many remained in that country (Ross, 1975, p.200). This only accentuated educational nationalism. The proximity to the United States in lieu of Europe assisted, what could be aptly described as, Canada's first brain drain.

In 1894, James Louden, then president of the University of Toronto, succeeded in having the D.Paed. [Doctor Paedagogiae, doctor of pedagogy] degree offered at that university, and after much lobbying the university senate approved the Ph.D. degree in 1897 (Ross, 1975, p.194). Louden's efforts were hampered by the fact that the number of Ph.D. graduates that could be employed in Canada was small, as higher education was not growing at a rate similar to that in the United States

(Squair, 1904). As an indication of the demand for academic staff, Ross (1976, p.26) records that in 1850, Canada had only 10 universities, and the United States had 800. Although it seems reasonable to suspect that the latter figure may have included degree-granting colleges, the demand for academic staff in Canada was indisputably smaller than in the United States. At McGill University, the Ph.D. degree appeared in 1906, nine years after it was offered at the University of Toronto (Frost, 1967); although the availability of two earned doctorates, the D.Litt. [Doctor Litterarum, doctor of letters] degree, and the D.Sc. [Doctor Scientiarum, doctor of science] degree preceded the doctor of philosophy degree at McGill (Harris, 1976, p.312). By the end of the nineteenth century the Ph.D. degree was well established in Canada.

In 1906, the requirements for the Ph.D degree in Canada had been standardized, and they are summarized as follows: three years of full-time study beyond the baccalaureate degree, a major and two minor subjects, one outside major subject, a reading knowledge of French and German, a comprehensive examination in the major field, and a thesis (Harris, 1976, p.312). These theses, as they were specified in 1906, embodied "...the results of original investigation..." at the University of Toronto, and represented a "...distinct contribution to knowledge..." at McGill University (Harris, 1976, p.431). Canadian Ph.D. degrees were first conferred at the University of Toronto on three male students in 1900 and two female students in 1903 (Mills and Dombra, 1968, pp.24,131). Although the availability of the doctor of philosophy degree in Canada did not stop all prospective doctoral students from leaving the country, it did reduce the number.

The early influence of the German doctorate, in the formulation of the academic requirements for the Canadian doctor of philosophy degree, is clearly evident in a speech delivered to the Royal Society of Canada (Louden, 1902):

> As to the ultimate scientific value of what has already been accomplished in the way of research under the influence of this recent movement [the rapid development of graduate programmes in the U.S.A.], there is room for a qualifying remark. It must be remembered that much of the graduate work referred to does not mean actual research, the course for the Ph.D. in many cases being no higher than the honours B.A. course with us. What is required to remedy this unsatisfactory condition is that the Ph.D. be given only on the German plan, and that the main test therefore, a research, be published. When this condition becomes absolute there will be material for the world's judgement as to the amount and quality of the contribution to the advancement of knowledge (p.vi).

At Canadian universities there was little demand for Ph.D. degree holders during the First World War [1914-1918], the Great Depression [1929-1939], and the Second World War [1939-1945]; whereas the period between 1950 and 1975 "...were years of unprecedented growth..." for universities in Canada (McNeal, Hodysh, and Konrad, 1981, p.C21), as students from the post-war population boom arrived on campuses across the nation. This growth spurred on the development of Ph.D. degree programs in Canadian universities. In 1944-45, five universities offered a Ph.D. degree program, whereas by 1978 the number had risen to 34 (Zur-Muehlen, 1978, p.71). This growth prompted Bonneau and Corry (1972, p.54) to state that, "[t]oo many departments in too many universities are offering Ph.D. programs they are not equipped to mount, to the detriment of graduate work in the country as a whole." Since the 1970s the number has dropped, and 30 universities across Canada now offer the doctor of philosophy degree (Archer, 1990, pp.952-1506).

Thirteen years ago, Zur-Muehlen (1978, p.83) calculated that in Canada only "...one out of four of the 2,000 new Ph.D.s produced each year will be absorbed as replacements for Ph.D. holders who retire, die, or withdraw for health reasons." Accentuating this, is the recent loosening of the mandatory retirement regulations which will inevitably slow the absorption even more. This situation is less favorable than the one existing in the United States. The overall employment picture in that country is very promising for most, but not all, Ph.D. degree holders. Bestor (1982, p.251) has assessed that in the United States "[b]etween 1980 and 2000, only one in 10 holders of humanities doctorates will ever find academic employment, with not all of these finding jobs leading to tenure and a permanent career."

If educational nationalism stimulated the adoption of the Ph.D. degree by Canadian universities, then political nationalism stimulated its acceptance by British universities. Certainly all of the older universities in Great Britain had been moulded, logically, by the universities in continental Europe. The University of Oxford, founded circa 1167, was in its formative years influenced by the university in Paris according to McNeal, Hodysh, and Konrad (1981, p.C15) who cite Rashdall's (1936) scholarly work on mediaeval universities. Whereas, at the university in Glasgow, founded in 1451, the intent was to use the university at Bologna as the model to follow (Coulton, 1913, p.654). Historically, the emphasis in British universities was placed on teaching students at the baccalaureate level. The emphasis on conducting research, which first gained prominence in German-speaking universities, and which was later grasped eagerly by universities in the United States and then Canada, was generally not of primary importance at British universities until the early twentieth century. However, a number of developments paved the way for the provision of the Ph.D. degree. Rudd and Simpson (1975, p.9) identify the University of Durham where a M.Sc. [Magister Scientiarum, master of science] degree was introduced in 1878, and where four years later a more advanced degree, the D.Sc. [Doctor Scientiarum, doctor of science] degree was offered. Other universities throughout Great Britain also offered post-baccalaureate programs, to quote Rudd and Simpson (1975):

> By the turn of the century, the British universities were coming to the end of the first stage in the evolution of higher degrees. An earned mastership was available - or about to become available - in most universities other than Oxford and Cambridge; this provided a goal for students wanting to take their studies beyond first degree level by a year or two. Doctorates were now awarded in most fields; however, these required the student to do some high level research and produce original work of considerable calibre, and, moreover, the thesis could not normally be submitted until at least five years had elapsed after the first degree. Unlike Germany and North America, Britain did not yet have the lower doctorate that could be gained after two or three years' research, the Ph.D.. This degree was originally introduced in Germany, well before the nineteenth century, and had taken a form which is somewhat different from that to which we are now accustomed in Britain (pp.9,10).

With respect to the reference to a lower doctorate, and by implication, the existence of a higher doctorate, some institutions in the United States have granted the D.Sc. degree as an honorary title. Spurr (1970, pp.16,17) claims "[t]his practice is particularly unfortunate since the D.Sc. in England, other British Commonwealth countries, the U.S.S.R., and elsewhere is the highest earned doctorate, substantially above the Ph.D. in measurement of maturity and scientific accomplishment." Later works which make reference to Great Britain

(Kogan Page, 1985, pp.49,50) and the U.S.S.R. (Holmes, 1987, p.10) confirm Spurr's claim.

But ultimately, what brought the Ph.D. degree to Great Britain was political nationalism. Assisting the process were several significant related events. In 1916, the chairman of a conference of Canadian universities is quoted by Sartain (1955, p.482) as saying that only by establishing doctorates which may be "...obtained within a reasonable time, and by subvention through scholarships can we hope that the stream of students which of late has set towards the United States will be diverted to the universities of Britain." For although Canadian professors still encouraged their brighter students to undertake post-baccalaureate study in the United States, others involved with higher education in Canada were not in favor of Canadian students going south of the border. Too many graduates did not return. Canadian university officials felt that if Canadian students could study in Great Britain, there would be an increased likelihood that they would return to Canada at the completion of their studies, because home was a long sea voyage away. Whereas for those students who studied and stayed in the United States, home was a convenient two-day train trip away.

To achieve this, British universities had to accept Canadian university degrees. To this end, Canadian university administrators participated in several conferences in Britain leading up to the first congress of universities of the empire, which was held in Great Britain in 1912 (Rudd and Simpson, 1975, p.12). At this congress, a direct proposal that British universities should offer the Ph.D. degree was made. This pressure exerted by colonial universities, in conjunction with the fact that British students were going to Europe to take their Ph.D. degrees, soften academic resistance. One institution which expressed a strong objection to the degree was the University of London, because "...the conditions of study proposed for it were very similar to those of the London master's degree" (Rudd and Simpson, 1975, p.13); and from 1860 onwards, a D.Sc. degree had been available at that university (Simpson, 1983, p.36). The final event that brought the Ph.D. degree to Great Britain was the outbreak of the First World War. This development prevented students from travelling to Germany, and it clearly showed how sophisticated and effective German science had become. To those in Great Britain holding positions of influence and political importance, it was unthinkable that Germany could have risen to such high academic stature, which in turn had aided it to exert military power and economic domination over much of Europe. On this point Blackett (1969, p.1) says, "[t]he dominance of Germany in the pure sciences including medicine during the last half of the nineteenth and the beginning of the twentieth centuries must have owed much to the institution of the Doctorate as an award for research achievement."

Inevitably, the doctorate was established in institutions of higher education in Great Britain. In her account of the degree, Simpson (1983, p.135) states that, "...Oxford was indeed the first British university to award the Ph.D. or – as in its traditionally individualistic fashion it designates it – the D.Phil." At the University of Cambridge a somewhat similar process prevailed. Demands coming from outside of the institution and a changing milieu, the result of the war, pressured the university to accept the need for the Ph.D.

degree. A [Syndicate] report tabled at a meeting held at the University of Cambridge in 1918 is described by Sartain (1955), as follows:

> It said little on the general problem that was new or that has not already been mentioned in this note, but it repeated with emphasis, evidence, and authority, the following propositions: (i) There has been a widespread practice in the universities of Canada and the United States, by which graduates have pursued their studies partly in their own and partly in other universities. (ii) Before the war the majority of those who left their own country for such a purpose went to German universities. (iii) There is a general desire in the United States and the Dominions that in future the flow of such students should be directed to a much greater extent than at present to British universities. (iv) It is essential that such students should not only find suitable conditions for pursuing their studies, but should also be able to obtain definite recognition of their work. (v) It is indispensible that such recognition should take the form of a Doctor's degree. The Syndicate added that they had come to the conclusion that the title of the degree should be Philosophiae Doctor [Ph.D.] for the reasons that this title was the one in general use for the purpose in North America and elsewhere, and that it would mark the degree as quite distinct from the doctorates given at the time by this University; the title would cover both literary and scientific studies (p.483).

The final result of this report was Cambridge listing the Ph.D. degree in 1920. In the same year the University of Oxford conferred its first Ph.D. degree on a male graduate (Bailey, 1989). In British universities the doctor of philosophy degree has always been considered an earned research degree, and the emphasis has always been placed on the thesis. As an example, the doctoral thesis at Oxford is expected to make a significant and substantial contribution in the field selected by the candidate (Kogan Page, 1985, pp.49,50). This emphasis on the thesis has been criticized for being too rigid and irrelevant to future careers, and recently, a Dr. Warren of the Rockefeller Foundation is quoted by Surridge (1989, p.2) as saying, "[t]he whole [British] system should be loosened up and the thesis dropped...." Only in the 1980s has the issue of taught courses become a topical national concern (Ash et al., 1988, p.2); although, the matter was raised 20 years earlier in a report by Swann (1968) which was submitted to the British parliament by the Secretary of State for Education and Science, and the Minister of Technology. A total of 49 universities in Great Britain now offer the doctor of philosophy degree (Archer, 1990, pp.280-948).

Of the four countries mentioned, Australia was the last to offer the Ph.D. degree in its universities; like the students from the United States, Canada, and Great Britain, students from Australia were at first compelled to leave their country to obtain a graduate education. To facilitate this study, Australian university administrators participated in the Allied Colonial Universities Conference in Great Britain in 1903, and the Imperial Conference on Education in 1907 (Rudd and Simpson, 1975, p.11). At these gatherings the issue of colonial university degrees, as acceptable entry degrees for graduate study, was discussed. By 1918, British universities generally accepted Australian university degrees as graduate entry requirements (Rudd and Simpson, 1975, p.13). Hill and Johnston (1984, p.122) claim that doctoral education was slow in developing because of the "...traditional cultural cringe to overseas universities for higher level education." A good example is the sciences, where until 1970 one examiner for the degree had to be from "overseas" (Hill, Fensham, and Howden, 1974, p.14). But this perspective arose not solely from a colonial obsequiousness, but from a combination of existing academic inadequacies in the yet-young universities [e.g., library facilities], and the belief the Ph.D. degree signified, and therefore necessitated, a broad international education.

A degree undertaken at an isolated university in an isolated country was deemed not in keeping with the meaning of the doctorate. The argument for studying overseas is stated eloquently by Mitchell (1959):

> There is the conviction that in most of the Arts subjects a Ph.D. ought to be done abroad, that no one should have a doctorate in German who has not studied in Germany, that no one should have a doctorate in English who has not studied in the great libraries of England and experienced life and tradition at first hand. Apart from such reasons, which might be adduced for every subject, there is the general principle that a Ph.D. in Arts should be proof of first-hand knowledge of the European home of our civilizations and traditions and of a scholar's exposure to other influences than those operating in his own university. At the Ph.D. level, it is believed, scholarship should operate and should be experienced at the international, cosmopolitan level. In many subjects, of which modern foreign and classical languages are obvious examples, a Ph.D. done entirely in Australia would, even if satisfying the accepted Ph.D. requirements, have a regrettable parochial limitation about it (p.86).

This situation, exacerbated by staffing problems, persisted until after the end of the Second World War. Slowly, a new and more receptive attitude toward postgraduate education evolved. An Australian encyclopedia (Grolier Society, 1983, p.134) shows the Ph.D. degree became available in 1945. Archival records confirm the first doctorates were awarded to three males and two females at the University of Melbourne in 1948 (Arthur, 1989), and the University of Sydney awarded its first doctorates in 1951 (Smith, 1989). Because of the delay in the acceptance of the degree, which resulted in the establishment of very sound master's degrees, the Ph.D. degree in Australia is similar to both the British and the North American doctorates. Similar to the situation in the United States, students generally commence their doctorate after the master's degree; direct entry with only a baccalaureate degree is not the norm. Similar to Great Britain, emphasis is placed on the thesis, and taught courses are not required. Reflecting on doctoral education in Australia in the 1990s, Stranks (1984) writes:

> The lack of any significant formal course work within our Ph.D., and master's degrees by research has continued for three decades. The focus of our Ph.D. type research degrees continues to be the research project, and this is almost the only medium by which education is accomplished (p.171).

He goes on to discuss the inclusion of taught courses within Ph.D. programs, and claims these courses need not be as extensive as in the United States because of the very stringent academic demands of the Australian master's degree. Currently, the Ph.D. degree is offered in 24 institutions in Australia (Archer, 1990, pp.1-224).

Regulatory and Prescriptive Literature

Doctoral students must comply with regulations which typically appear in an institutional handbook. Written requests [Appendix A] were made to 101 institutions asking for a copy of the handbook pertinent to their Ph.D. degree. This figure was derived as follows: **Australia** - 24 institutions offer the degree and seven of the largest were selected; **Canada** - 30 institutions offer the degree and 14 were selected with a geographical consideration; **Great Britain** - 49 institutions offer the degree and 10 were randomly selected; **United States** - 377 institutions confer doctoral degrees, and 70 were selected. Each of the institutions selected receives over $33 million annually in government research grants, and each awards over 50 Ph.D. degrees a year according to the Carnegie Foundation for the Advancement of Teaching (The Chronicle of Higher Education, 1988, p.64).

Sixty-one of these handbooks were received and reviewed, and the fundamental components of the contemporary Ph.D. degree were determined

[Appendix B]. This profile reveals three components are the norm among the institutions assessed. These components are as follows: 1. a lengthy period of study [years]; 2. mandatory original research [research requirements]; and 3. preparation of a thesis, with only a small number of institutions [Great Britain 1, United States 5] allowing an alternative format [thesis options]. Caution is advised when considering the figure for years as it may incorporate time to complete a master's degree, or reflect institutional residence requirements, or time from first accceptance into the program, or time from candidacy.

Research literature that focuses on the Ph.D.degree is sparse. Although works by Herron (1988), Reeves (1988), Rosovsky (1990), Ross (1976), and Smith (1990) touch the subject these texts generally cover a wide range of university related topics. **True Confessions of a Ph.D. and Recommendations for Reform** by Atkinson (1939), and **Toward Improving Ph.D. Programs** by Hollis (1945) were two earlier and more specific attempts to review and evaluate doctoral education. Subsequently, a number of more recent works related to the degree have been published. One work which is frequently cited is the lengthy work by Berelson (1960). It was therefore decided to select nine additional works published after Berelson's. By doing this, the possibility of including studies which focused on more historical problems could be reduced. As the degree is 700 years old, related works published since Berelson's can be described as recent literature. The selection process was simplified by the fact that the studies which were chosen constituted almost all of the recent literature on the degree. In these studies the degree was considered in its historical, educational, and institutional contexts, and the works included books, conference proceedings, papers, and reports published over a period of 28 years [1960-1988]. The authors of these works have studied and described the status quo of the Ph.D. degree, and then gone on to prescribe recommendations considered necessary to improve problems perceived to exist with the degree.

An extract was taken from each of these studies, hereafter numbered 1-10, and key point prescriptive summaries were prepared [Appendix C]. A national breakdown of the literature reveals two works [6,7] are from Australia [AU]; two [2,9] came from Canada [CA]; two [3,10] were published in Great Britain [GB]; and four [1,4,5,8] are from the United States [US]. Considering all the key points raised and listed in Table 3, it is apparent many aspects of the Ph.D. degree, as highlighted in Chapter I, have been the focus of deliberation over an extended period of time. The key points also reveal that concerns are being expressed in all of the four countries. More importantly, the table reveals that within the prescriptive literature on the degree, the majority of the concerns focus on the three fundamental components of the degree, which have been identified within the historical and regulatory literature.

From Table 3 there are 20 recommendations, hereafter labeled A-T, which have been prescribed to improve the Ph.D. degree. These recommendations can be coarsely separated into three groups which correspond with the three fundamental components of the degree: **Lengthy Study** – E,F,K,L,M; **Original Research** – E,H,I,K,N,O; and **Thesis Preparation** – A,B,D,G,R,S. Five of the recommendations, C,J,P,Q,T, cannot be assigned to any of the groups as they do not apply directly to the degree acquisition process as it occurs within the university.

Table 3: Recommendations prescribed for Ph.D. degree [1960-1988]

RECOMMENDATION	LITERATURE* 1	2	3	4	5	6	7	8	9	10
A. accept alternatives to thesis				X			X	X	X	
B. approve innovative theses and regulations		X	X	X	X			X		
C. approve interdisciplinary studies							X			
D. correct writing deficiencies	X									
E. decrease completion time	X	X	X	X	X					
F. decrease course work		X								
G. decrease length of thesis	X	X		X			X			
H. decrease research emphasis		X	X							
I. ensure financial support	X	X								
J. facilitate mature student entry			X							
K. improve advising/directing/supervising	X	X	X	X	X		X			
L. incorporate teacher training	X			X				X	X	
M. increase number of or require courses			X				X			X
N. increase involvement by industry	X		X							
O. increase research emphasis					X	X				X
P. provide post-doctoral program	X		X							
Q. require pre-doctoral employment							X			
R. thesis should add to knowledge						X				
S. thesis should enhance learning						X				
T. tighten entry restrictions	X	X								

* **Literature**:

1.	Berelson	1960 [US]		6.	Moses	1984 [AU]
2.	Bladen	1962 [CA]		7.	Stranks	1984 [AU]
3.	Swann	1968 [GB]		8.	Lynton & Elman	1987 [US]
4.	Spurr	1970 [US]		9.	Cude	1987 [CA]
5.	Storr	1973 [US]		10.	Ash et al.	1988 [GB]

Summary

The Ph.D. degree first appeared in the European universitas, and its research focus, as instigated at the university in Berlin by Humboldt, has been adopted in the United States, Canada, Great Britain, then Australia. Additional requirements [e.g., full-time attendance], which differ from institution to institution and country to country, have over the years been demanded. At various times and places this doctorate has been considered an honorary title, a university teaching credential, a research training program, and a knowledge generating process.

Acquiring the Ph.D. degree has always necessitated the completion of three fundamental components [lengthy study, original research, thesis preparation]. **Lengthy Study** – the time doctoral students spend doing all those things, whether they be directed [e.g., attending courses] or non-directed [e.g., reading, thinking], which assist with the acquisition of the degree. As set out in Appendix B, universities typically have a maximum time, usually specified in years, in which the Ph.D. degree shall be completed. Two terms associated with lengthy study are total time-to-degree [TTD] and registered time-to-degree [RTD]. Respectively, TTD is the calendar time between earning a bachelor's degree and a doctorate, and RTD is the calendar time in graduate school (Association of American Universities, 1990, p.1). **Original Research** - research not previously undertaken, carried out in accordance with university regulations, with the approval of a department or faculty, and under the direction of an individual deemed qualified to supervise doctoral research. Defining the phrase, as it pertains to Ph.D. level work is not a simple task. In the United States a report by the Council of Graduate Schools (1991, p.8) states, "[i]n its most general sense, 'original' describes research that has not been done previously or a project that creates new knowledge." Two terms frequently associated with the phrase original research are "significant" and "independent." The various meaning of these terms, as defined in one of the four countries mentioned is revealed in Appendix D. As qualifying terms, significant and independent are secondary to original, which is the concept Humboldt promoted and which is readily evident in the contemporary academic components of Ph.D. degrees listed in Appendix B.

Thesis Preparation – the preparation of a manuscript in which the original research is documented [thesis subsumes dissertation in this thesis]. As used here, thesis preparation refers to the necessity of preparing a statement, usually in the form of a written document. It does not include how that document should be prepared, because, as stated by the Council of Graduate Schools (1991, p.12), "...what constitutes a dissertation and in what forms the material may be presented vary across disciplines and among universities." Characteristics of doctoral theses and a recommendation for reform in one of the four countries mentioned are defined in Appendix E.

Finally, a number of atheoretical Ph.D. degree related studies have been conducted and optimistic recommendations, which could enhance or detract from the resultant degree, have been prescribed. Before acting on these recommendations, it would be wise to seek corroborative research data based on a conceptual framework. Such a framework is described in the following chapter.

III

CONCEPTUAL FRAMEWORK

Research Question

Within the literature the attainment process and purpose of the Ph.D. degree is contentious, with several aspects causing concern [e.g., attrition, program emphasis]. Historically, the degree has required the completion of the three fundamantal components, lengthy study, original research, and thesis preparation. Although these components are generally the norm in universities in the four countries mentioned, modifications to, substitutions for, and deletions of, these components have been recommended in related prescriptive literature. Within this literature recommended changes to the components have been accompanied by optimistic projections and unsubstantiated claims of enhancement. In some cases, these recommendations are made by solitary individuals, and in other cases the claims lack supportive research data.

Therefore, in light of the above, the question in this study was as follows. **What effect, either positive or negative, do experts think altering the fundamental components [lengthy study, original research, thesis preparation] of the degree Philosophiae Doctor, will most likely have on the resultant degree?** To answer this research question within a framework posed difficulties. A search of the literature revealed two deficiencies. No theory-based study of the Ph.D. degree has ever been undertaken, and second, in higher education and educational administration no relevant theory exists. As a result, considerable deliberation and consultation was undertaken to derive a conceptual framework which could be used as a guiding structure for this introductory research.

Higher education is a new field of inquiry in relation to the established disciplines, e.g., natural sciences. Peterson (1974, p.296) has commented on the absence of research-based knowledge in higher education, and Dressel and Mayhew (1974, pp.3,4) write, "[m]oreover a discipline commonly involves some generally accepted body of theory and some generally understood techniques for theory testing and revision. Here the literature of higher education appears decidedly lacking." Those studying the field of higher education administration, for example, do not have the wealth of literature which the disciplines have (Crosson and Nelson, 1986; McConnell, 1963), and Griffiths (1988, p.48) points out that as yet there are no real theories in educational administration. Clearly, any research related to the Ph.D. degree is confronted with a theoretical challenge. For Campbell (1957, 1986) it would not be a wise decision to turn to an alternate non-educationally related area in the search for a framework, as he believes not all theories are universal. Alternative areas included [note the university is almost in a monopolistic position with respect to conferring Ph.D. degrees, an exception is the RAND corporation], there is no theory-based research on the degree which can be drawn upon. Advancing the argument, Griffiths (1988, p.48) states that "...it would seem necessary to have theories specific to particular types of educational institutions." Therefore, it was considered necessary to have a conceptual framework which focused on the Ph.D. degree.

What follows is a model, constructed with careful attention to the literature on model building. Looking at the acquisition of knowledge, Anderson (1984) classifies learning schema into two categories. One category is characterized by scientific theory based on principles and precision which allows predictions to be made. The other category is characterized by a lack of definition, overlaping aspects, and arbitary relationships, which allows some order in an imprecise world. The model falls, due to the absence of higher education theory, within the second category. It was used in this thesis as the conceptual framework to generate knowledge about, in Sternberg's (1981, p.5) words, the least understood higher education degree the "dissertation doctorate," which answered the research question.

Ph.D. Degree Acquisition Model and Limitations

The Ph.D. degree has always necessitated the completion of three fundamental components [lengthy study, original research, thesis preparation]. During the 700 years the degree has existed, these three components have been mandatory. Logically, there is a relationship between these components and the completed doctorate. By undertaking and completing the components students acquired a Ph.D. degree. This reality can be transformed into a rudimentary model [Figure 1]. Here, it should be noted Asher (1984, p.6) states models are a "...vast oversimplification of reality...," but they do provide "...understanding and insight into real world processes."

Figure 1: Ph.D. degree acquisition model

pre institution		within institution		post institution
STUDENT ENTRY	LENGTHY STUDY	ORIGINAL RESEARCH	THESIS PREPARATION	GRADUATE EXIT
	●	●	●	

For this depiction Banki's (1986, p.352) definition of formal symbolic model is used. He states that a model is an abstract representation of the "...significant assumptions, hypotheses, generalizations or projections of real or ideal variables of primary interest." He points out that models can be expressed in mathematical, statistical, logical or graphic terms or symbols, and that they are "...used for purposes of further investigation, analysis, model construction, problem solving or decision making."

With respect to the historical and regulatory literature reviewed, the three components identified are, although interrelated, real variables. Each of the components represents a phase of the degree acquisition process, and each component is a variable which can be modified. Kaplan (1964, pp.259-262), in his explanation of the meaning of the word formal as it is used in conjunction with models, states that the major "...terms are not given any interpretation..." and that the final derivative is dependent "...upon the pattern of relationships holding among the symbols themselves." A similar belief is expressed by Barbour (1974, p.30) who writes that models facilitate conceptual terms which cannot be deduced from isolated observed data.

The Ph.D. degree acquisition model lies on the theory continuum described by Dewey (1913, p.606), who says that a theory is "...any conception which is employed to explain and organize a body of facts. Its sense varies from the subjective to the objective; that is from the notion of an unproved idea to a law." Clearly, the model with its three components falls somewhere between the two poles of Dewey's continuum; somewhere between the subjective unproved idea and the objective proven law. Kaplan (1964, p.267) states that "[a] formal model is a model of a theory...," but the model should not quickly be interpreted as a theory, but rather as a precursor of theory. What the model does is facilitate the ordering of existing data [the fundamental components of the degree and the final degree itself], which, if isolated, have little conceptual meaning. It also allows the formulation of hypotheses based on the relationships between the data, but does not offer the power of precision and understanding which theory, the more refined and powerful research tool, permits (Kaplan, 1964, p.346).

For a model to be sound, isomorphism is required. Brodbeck (1969, p.580) describes isomorphism as the similarity between the model and what it represents, as a "...one-to-one correspondence between the elements of the model and the elements of the thing of which it is the model...," and that "...certain relations are preserved." Based on the historical and regulatory literature reviewed, the correspondence between the doctorate and the acquisition model is complete: both have three, and only three, fundamental components; both have only one end product; both indicate that completion of the components ultimately leads to the acquistion of the Ph.D. degree.

A model, according to Fiorina (1984, pp.70-73), enforces a tightness in arguments, makes assumptions explicit, facilitates logical consistency with arguments, enhances the fuller development of the logical implications of the model, and on working through the model it is possible to generate a set of testable statements [hypotheses]. In this study the acquisition model provided a structure for the fundamental components of the degree and reflects the outcome of the completion of these components. From the model, the doctor of philosophy degree is always the outcome if all the components are completed. Students enter the institution, where they commence a lengthy period of study, which, in time, leads to an original piece of research, the findings of which are prepared and presented in the form of a written thesis. Because the components are interrelated, they are not identified as stages, which suggests a hierarchical order, but rather as phases, which accommodates a back and forth movement. Although this movement is not stated in the literature or in the model, it is a fact of life for doctoral students.

Returning to Banki's (1986, p.352) definition, the Ph.D. acquisition model can also be defined in mathematical terms in the form of an equation. In this representation [Figure 2], each of the fundamental components and the resultant degree are reduced to nominal numbers. [The model could also be defined algebraically in the form of a + b + c = d.] In the first variation within the figure, the whole

Figure 2: Ph.D. degree acquisition model [mathematical variations]

pre institution			within institution				post institution
STUDENT ENTRY	**LENGTHY STUDY**		**ORIGINAL RESEARCH**		**THESIS PREPARATION**		GRADUATE EXIT
1.	**1**	+	**1**	+	**1**	=	3
2.	**6/12**	+	**18/12**	+	**12/12**	=	3
3.	**8/12**	+	**18/12**	+	**10/12**	=	3
4.	**14/12**	+	**18/12**	+	**16/12**	=	4
5.	**16/12**	+	**10/12**	+	**22/12**	=	4

number 1 refers to one unit of work related specifically to the component above each number. In this variation the sum of the units of work is 3, and this summation represents the resultant doctor of philosophy degree.

These units of work associated with the fundamental components of the degree will not normally be equal, as different amounts of time, physical energy, and intellectual energy are required to complete each of the units. To depict this reality, the representative numbers can be depicted in the form of fractions based on the desired or actual work required to complete each component. These fractions can then be adjusted accordingly, with respect to a quantifiable work criterion which could be one of several commonly used by universities [e.g., credit hours, months, semesters, years, etc.].

For example, in variation two the common criterion denominator has been set at 12 and the quantity numerators are 6, 18, and 12. This example actually reflects a work criterion defined by the British Council. In a document prepared by the Council's Committee for International Co-operation in Higher Education (1987), a question related to the completion of a British Ph.D. degree is answered below. The answer clearly reveals the three fundamental components.

> How long does it take to complete a British Ph.D.? A research student in Britain usually takes three years to complete a Ph.D.. The usual pattern falls into the three phases: identification of topic, survey of literature, preliminary assessment and plan - six months; hypothesis, research and conclusions - 12 to 18 months; writing up thesis, examination - 12 months (p.17).

In the third variation, the fraction [unit of work] for the fundamental component of original research remains unchanged, but the other two fractions have been readjusted. Here the allocation of appropriate numerators [work quantities] becomes problematic.

In variation four, the problem is compounded when the degree is defined by a different number [e.g., 4]. This would be the case if the standard for the degree was amended. Now, the problem is how the additional one unit of work is going to be allocated among the three fundamental components. On comparing the fourth variation with the third, it can be seen that the unit of work fraction allocated to the fundamental lengthy study component, has changed; the work criterion [denominator] is the same but the quantity [numerator] has been increased. For the original research component the fraction remains unchanged, whereas the numerator of the fraction representing the thesis preparation component has been increased. If variation four was to represent an officially desired allocation of work, and variation five was to represent the actual work as allocated by a doctoral student, the incongruence between the official and the actual in the acquisition process demonstrates the complexity of deriving definitive definitions for the fundamental components of the degree.

Any change in the resultant Ph.D. degree, or in the fundamental components of this degree, requires a reassessment of the relationships among the components and the resultant degree. Flowing on from this change, the definitions of the fundamental components would also have to be amended.

Using mathematical terms, several aspects of the Ph.D. acquisition model can be clarified. The resultant degree is the summation of three numbers [units of work], all of which are required to reach the given sum. Should a unit of work number be deleted, or should any number be adjusted without a commensurate adjustment in another number or numbers, the same result will not be achieved. The doctorate can only be acquired when the sum of three numbers, related to the fundamental components, equals the number allocated to the degree. Therefore in light of the existing low level of knowledge related to the Ph.D. degree, to allocate precise numbers within the model, or to define specifically each fundamental component and the resultant degree and their inter-relationships is fraught with uncertainties.

This uncertainity is inherent in models. Barbour (1974, p.34) states that models are not absolutes, but they can be "...used to generate plausible hypotheses to investigate." What the model does not explain, which as a precursor to theory it cannot, are the exact relationships between the fundamental components and the completed degree. Other than indicating the general outcome, the model does not reflect the definitive relationships between the components and the resultant doctorate. On this point the model is an analog of the available Ph.D. degree related data; it does not indicate relationships which are not stated within the historical or regulatory literature. It is these relationships which, once determined, would enable a measure of prediction with respect to the Ph.D. acquisition process.

However, reviewing the prescriptive literature published between 1960 and 1988, relationships are suggested. [On this point Dewey (1933, p.174) describes the importance of reviewing a number of related cases. He says, "[t]he object of bringing into consideration a multitude of cases is to facilitate the selection of the evidential or significant features upon which to base inference in some single case."] This prescriptive literature indicates that the attainment of the Ph.D. degree does not include educational requirements considered important to the times, and that the doctorate will be improved by making various alterations to its fundamental components. Specifically, by modifying or deleting the components, the degree will be improved and brought more in line with perceived existing needs. But the model makes it clear that if any of the components are deleted, it is not possible to arrive at a Ph.D. degree. The model also indicates that if the components are altered it will have an effect on the resultant degree. Therefore, based on the Ph.D. aquisition model, it was hypothesized that altering the fundamental components may have an effect on the resultant degree. Because the model lacks the power of a theory or a law, effect was defined in positive-negative terms.

LIMITATIONS. All models have shortcomings, and limitations specific to the Ph.D. acquisition model are detailed below.

The first is incomplete isomorphism. Because the Ph.D. degree is most commonly undertaken within a university setting it is, therefore, subject to all the attendant academic influences. Nor does its acquisition occur in isolation from society in general. These influences, from within the university and from without, on the acquisition process may be substantial. Here the model is limited because it does not accommodate these influences. Brodbeck (1969) has pointed out the importance of having models that are complete to avoid being misleading. This incompleteness of the model needs to be studied, and the unidentified influencing forces to be identified and included.

Of note here is that each university, and possibly each student, is surrounded by a unique social milieu which influences the acquisition of a Ph.D. degree. To identify these influences would be a major and extremely time-consuming endeavour, as it would necessitate an investigation of the educational history, culture, and infrastructure related to each university. As well, the disposition of individual students would have to be considered.

Next, is level of explanation. Corwin, Lane, and Monahan (1975, p.82) state that, "[t]he overall function of theory is to explain." Certainly there can be no dispute that this is the function of theory, but what the statement lacks is qualification of the term explain. As Halpin (1960, p.3) points out, knowledge, which by definition is an explanation, is always partial and incomplete. There are different levels of explanations which can range from the rudimentary to the sophisticated, from Dewey's (1913, p.606) subjective to the objective. As precursors to theories, models lack sophistication, but they provide an explanation a level higher than the, to use Dewey's terms again, notion of an unproved idea. To pursue a higher level of explanation requires at any given time, some existing level of explanation, and predictions [hypotheses] of what that higher level may be. Without the former, there can be no higher level, and without the latter, the researcher would be unable to conclude if a higher level of explanation had be achieved. With respect to the model, the setting in which it was used was one where the level of explanation related to issues relevant to the Ph.D. degree was at the rudimentary level. To pursue a higher level of explanation, one which addressed the entire degree and not just a single related problematic issue, a conceptual framework was necessary. Hence the application of the Ph.D. acquisition model, which facilitated a higher, albeit limited, level of explanation.

The third and final limitation is simplification. As Asher (1984) and Keeves (1988) have pointed out, models necessitate simplification, but the inherent problem associated with this is oversimplification. Writing on the building of models, Keeves (1988, p.560) states that the issue of "...oversimplification in the use of a model is not that the model is built incorrectly, but that in the process of abstraction the model has been built with simplification that has extended too far." With respect to the model, the three fundamental components are simplifications of complex and interrelated activities. However, the literature, both historical and prescriptive, as well as the typical university handbook related to the Ph.D. degree, treat the components as discrete. Furthermore, by not accepting this simplification it would be impossible to differentiate within an amorphous mass of interrelated variables. Relatedness between and among the components is acknowledged, and the completion of each of the components is described using the term phase, not stage, as the latter term suggests discrete and hierarchical components which can be completed individually without concern for the other components. Of course this is not what happens during the acquisition process. This process generally sees the doctoral student concentrating initially on the study component, then undertaking original research, then preparing a doctoral thesis, but during the entire process there is always a back-and-forth action with the student usually giving attention to more than one of the components at any time.

Even with fully developed theories, the higher order research tool, simplification occurs. On this point Brodbeck (1969, p.587) writes, "...uncertainty, selection, idealization, and quantification are characteristic to a greater or lesser degree of most worthwhile theories." Therefore, as a starting point for a study of an area in which no theory or theory-based research exist, simplification within the model was necessary.

Prognostics

As a conceptual framework the acquisition model stimulates hypotheses which are predictions related to the resultant Ph.D. degree. A prognosis of the characteristics of the resultant degree has to be made if the component variables, as represented in the model, are manipulated. In a paper on the nature of theory by Corwin, Lane, and Monahan (1975, p.76), in which they also cite an earlier work by Francis (1961), it is stated that "[c]orrectly understood, method is not separate from theory; method is part of theory." Therefore, to ensure compatibility between the conceptual framework [i.e., the model] and the methodology being used required an understanding of prognostics.

Over 12 years ago Henchey (1978) described prognostics as a rapidly growing field of study. Polak (1971) defines it as:

> ...the science, which...aims at exploring the future and acquiring probable knowledge of the future...it comprises those areas of prognostic reflection, viz., concerning the possible, ideally essential, and actually achievable future developments, in economic, social, technological, political, and cultural areas, and on both a national and worldwide scale (p.21).

Defining the purpose of prognostics, Shane (1973, p.1) writes that those undertaking prognostic studies are concerned with organizing data and enhancing decision making in the fields of business, government, and education.

Hencley and Yates (1974, p.viii) claim over 100 prognostic methods have been described within the literature, all of which fall within Popper's (1971, p.1) three categories: **exploratory** - types which take past or current trends, then project images of the future based on these trends, e.g., Monte Carlo technique (McCracken, 1968), and trend extrapolation (Martino, 1971); **intuitive** - types which make projections of the future based on experience and deductive thinking, e.g., cross impact matrices (Gordon and Hayward, 1968), and the Delphi technique (Dalkey, 1967); **normative** - types which take future needs, then work backward identifying what is required to achieve them, e.g., Bayesian statistics (Schmitt, 1969), and relevance trees (McGrath, 1974).

As an alternative to predictions offered by the natural sciences, prognostic forecasts reflect a "...plausible combinations of assumed determinants and initial conditions" (Johnston, 1970, p.177). They have been used widely to attain knowledge where more classical forms of research are not appropriate. Writing on the attainment of knowledge in relation to administrative theory, Halpin (1960) states:

> There is more than one gate to the kingdom of knowledge. Each gate opens upon a different vista, but no one vista exhausts the realm of reality.... Therefore it is important to understand what each vista can and cannot yield. To expect returns through one way of knowing which can be achieved only through another is to invite frustration and disillusion...all human knowledge is partial, and as human beings none of us is so rich in understanding that we can afford to ignore any of the several gates to the kingdom of knowledge (p.3).

In essence, his argument is that an appreciation of knowledge requires a balanced and broad perspective on the various ways of knowing. In a later work on the development of educational administration theory, Halpin (1966, p.19) continues the same line of thought, and claims that no discipline and its associated methods has a monopoly on wisdom and its attainment. Johnston (1970) has taken up the latter point and provides examples of research in the social sciences, where the results have subsequently been found to be inaccurate; more specifically, results from two entirely different research frameworks. To qualify this point Johnston (1970, p.174) states that with respect to predictions [explanations], projections [conditional explanations], and forecasts [plausible explanations], that "...neither the reasoned judgement of an insightful observer nor the refined techniques of the objective technician who works with masses of quantitative data can guarantee results which will meet the test of actual historical developments...."

Because of their theoretical importance, these two points need to be reiterated. Firstly, knowledge can be derived in a number of different ways; and secondly, the exactitude of knowledge can be temporary. Both these points appear in a volume on future school organizations, where Johnston (1972) writes on social prognostics:

> This profound and sobering truth is derived from the epistemological principle that all knowledge of the past, present, and a fortiori, future must take the form of ideal constructs whose components can only reflect the current state of our knowledge, and whose selection and organization reflect current notions of relevance and scientific acceptability. One consequence of this insight is that the art of forecasting must be recognized for what it is: an attempt to develop a plausible prognistication under environmental conditions whose workings are only partially understood and whose future states are only partially controlled at best (p.47).

To summarize, the strengths of prognostics can be listed as follows:

- the process can assist with anticipatory functions, e.g., enrollment projections;
- the process can assist with program planning and program evaluation;
- the process can assist with off-shoot planning, that is planning associated with needs linked to the original issue investigated by prognostics, e.g., population predictions can stimulate planning for housing and schools;
- the process can assist with the exploration of alternative futures;
- the process can create a heightened level of awareness concerning alternative futures;
- the process allows the issue to be considered beyond what is known;
- the process can be less expensive compared with experimental research;
- the process can provide more immediate answers [for problems which may not develop fully until sometime in the future];
- the process can generate information which can assist with decision and policy making processes;
- the process can assist people to adapt to new and changing realities;
- the process can stimulate creativity of thought;
- the process can stimulate long-term perspectives;
- the process can act as a bonding "social glue" keeping organizations from disintegrating into special interest groups;
- the process stimulates education [Toffler (1974) claims all education arises from some image of the future.];
- the process as a research methodology offers several alternatives;
- the process may be used to study problems where traditional methods may not be suited.

To summarize, the weaknesses of prognostics can be listed as follows:

- the process can obscure known facts through information overflow;
- the process can generate inaccurate information;
- the process can be applied to and wasted on peripheral issues which result from inaccurately defined problems;
- the process can generate information which may be destabilizing, e.g., "this organization cannot avoid going bankrupt sometime within the next two years";
- the process can result in the assumptions, upon which information is generated, being overlooked and accepted as facts;
- the process can produce information which cannot be used in the decision making or policy formation processes due to its [too] long time-frame;
- the process can stimulate debate over the methodology and the information derived can be disregarded;
- the process can create frustration by generating information which cannot be acted upon;
- the process can generate information which can be misinterpreted as being definitive;
- the process can result in unresolvable polarization around different predictions;
- the process can develop a momentum and generate information far in excess of that which is needed for the issue at hand.

Helmer (1968, p.116) believes many elements involved in projecting future developments are not amenable to quantification. To overcome this he believes that the collective knowledge and judgements of experienced individuals can be combined in a useful way. In the same vein, an earlier paper by Helmer and Rescher (1959) presents the case that where a complete and thoroughly defined theory as in the natural or exact sciences does not exist, the use of experts' informed judgement is justified. In a much earlier work, Whitehead (1925) argues that not all problems in Western society can be studied satisfactorily using the classical scientific method. Other methods however, e.g., prognostic research, can enable researchers to study problems of the unknown. In Hacke's (1968, p.145) words, prognostic research is valuable because of its ability to "...delineate the boundaries of the possible."

Summary

A research question was posed. As this question related to higher education which is a theory-poor field, there was a need to devise a suitable conceptual framework within which the question could be addressed. This led to the construction of a model, the Ph.D. acquisition model, based on the literature pertinent to that degree. It was shown that the function of a model is an ordering of experience (Barbour, 1974, p.45) - the Ph.D. acquisition model provides order; a model is a heuristic device (Van Dalen, 1979, p.56) which suggests how research might best be pursued (Marx, 1976, p.244) - the Ph.D. acquisition model offers this; a model can be applied to intangible concepts (Lachman, 1967, p.80) - the Ph.D. acquisition model does this; and, research based on a conceptual analog model, leads to deductively derived prognostic conclusions (Chapanis, 1967, p.116) - the Ph.D. acquisition model leads to these types of conclusions.

As a conceptual framework the model is precursory to a more substantive formulation which would lie further along Dewey's (1913, p.606) theory continuum. Its use is restricted to the university environment, as it has been formulated specifically from Ph.D. degree related data, and the explanation it provides is only relevant to the Ph.D. degree. The level of explanation which the model can provide is limited, but the level exceeds the current speculative knowledge. Models have limitations, but in an area devoid of theory and theory-based research, the Ph.D. acquisition model provided a conceptual framework which was used as an entrée for an investigation of the degree. This investigation involved a hypothetical manipulation of the three fundamental components of the degree. To carry out this investigation a compatible methodology used in prognostics, which was discussed, was used. This methodology is discussed in the following chapter.

IV

RESEARCH METHODOLOGY

Delphi Technique

Writing on education, Amara (1976) states that modern society is characterized by change, growth, and complexity, which Bachetti (1977) claims have favorable and adverse effects on higher education. This situation has prompted many institutions (Association for Institutional Research, 1989; Carnegie Foundation for the Advancement of Teaching, 1976; Higher Education Research and Development Society of Australasia, 1989; Society for Research into Higher Education (Morrison, 1990)) to undertake prognostic studies to determine what the future might hold for higher education. Logically, the future will in some ways reflect aspects of both the present and the past. On this point Kirschling and Huckfeldt (1980, p.205) believe institutions "...are held together by a blending of past, present, and future considerations." Their premise is that if knowledge of the past and present are available, it is possible to mount a study of future developments. Such a prognostic study can be conducted by applying a methodology called the Delphi technique.

As a deductive prognostic technique named after an ancient town of central Greece [the seat of an oracle of the [prophetic] god Apollo (Morris, 1975, p.350)], Delphi stems from RAND corporation research in the early 1950s, according to Dalkey and Helmer (1962). Within the voluminous related literature [the Pill (1971) bibliography contains over 40 entries, Hudson (1974) has more than 100 entries, Worsham (1980) exceeds 130 entries, and Linstone and Turoff (1975, p.3) claim the number of studies that have used Delphi may exceed 1,000], the technique is described as "...a method for structuring a group communication process so that the process is effective in allowing a group of individuals, as a whole, to deal with a complex problem" (Linstone and Turoff, 1975, p.3). Fazio (1985, p.149) has succinctly summarized the original objectives of the technique: 1. To determine and develop a range of possible program alternatives; 2. To explore or expose underlying assumptions or information leading to different judgements; 3. To seek out information which may generate a consensus on the part of the respondent group; 4. To correlate informed judgements on a topic spanning a wide range of disciplines; and 5. To educate the respondent group as to the diverse and interrelated aspects of the topic.

In its original form emphasis was placed on deriving a consensus from a panel of participants. However, later works (Linstone, 1978, p.297; Lonsdale, 1975, p.8; McGraw, Browne, and Rees, 1976, p.75) point out that to seek a consensus can be counterproductive, and that stability of response is a more desirable objective. This modification, not to strive for a consensus but rather to achieve a stable response, was adopted in the research recorded in this thesis.

Delphi has four characteristic elements. 1. **Anonymity**. Panel participants remain anonymous during the study. This "...avoids the effects of authority, as well as the development of a consensual bandwagon" according to Heydinger and Zentner (1983, p.62). It ensures the minority response is given full acknowledgement and prevents dominant individuals from influencing other panel members. [For ethical reasons no participant in this study was identified later with any specific findings of the study]. 2. **Feedback**. This element allows all participants to review and reconsider their individual response, and to adjust it in relation to the panel's response, if they believe their own response should be adjusted. If a participant's response is outside the panel's interquartile range, the participant can be asked to qualify that response. 3. **Iteration**. Participants are involved in repetitive rounds of decision making. Decisions are made in response to and after reflection upon the questions posed. Through an iterative rounds process, responses to questions posed in the previous round are returned to the panel until response stability is achieved. 4. **Statistical Analyses**. This element provides the participants and the researcher with quantitative descriptions of the responses submitted in the previous round, and the interquartile range [25-75 percent] reflects the range of these responses. The consistency of the responses can be assessed through the stability measurement computation as defined by Scheibe, Skutsch, and Schofer (1975). In their study of Delphi methodology, they write that a consensus is frequently assumed when a majority of the votes falls within a prescribed range, which does not give adequate consideration to all the information in the responses:

> Bimodal distribution may occur which will not be registered as a consensus but indicates an important and apparently insoluble cleft of opinion. Less dramatically, the distribution may flatten out and not reach any strong peaked shape at all. The results of the Delphi are no less important for this however.... A measure which takes into account such variations from the norm is one that measures not consensus as such, but stability of the respondents' vote distribution curve over successive rounds of the Delphi. Because the interest lies in the opinion of the group rather than in that of individuals, this method [stability measurement computation] is preferable to one that would measure the amount of change in each individual's vote between rounds (p.277).

The computation is based on differences between distributions of answers in consecutive rounds [e.g., Rounds 2 and 3]. Using 15 percent [the amount of oscillatory movement at the mode as determined by Scheibe, Skutsch, and Schofer (1975, p.278)] as the standard state of equilibrium, any two consecutive responses from a panel of participants which show changes of less than 15 percent are said to have reached stability or equilibrium; and any two consecutive responses which show more than 15 percent change should be included in the next round, as response stability has not yet been achieved [Appendix F].

As a prognostic technique Delphi has been applied in over 30 specific fields [Appendix G]. In education these areas include: curriculum development (Weaver, 1988; Wood and Davis, 1978), educational goals (Judd 1972), educational innovation (Helmer, 1966), educational institution planning (Uhl, 1983), international cooperation (Cookson, 1986), teacher education (Clarke and Coutts, 1971; Cyphert and Gant, 1970), training (Somers, Baker, and Isbell, 1984), and higher education for which a bibliography has been compiled [Appendix H].

STRENGTHS and WEAKNESSES. As a proponent of the technique Linstone (1978, p.275) states that where "[t]he problem does not lend itself to precise analytical techniques but can benefit from [informed] subjective judgements on a collective basis," and where "[t]he individuals who need to interact cannot be brought together in a face-to-face exchange because of time or cost constraints," Delphi is an appropriate methodology. Sackman (1974) has criticized the technique based on testing standards adopted by the American Psychological Association, but its wide and persistent usage makes a strong statement on the acceptance and utility of the results it produces. Several rebuttals to Sackman appear in the methodological literature (Coates, 1975; Linstone, 1978;

Nash, 1978; Turoff, 1975). Nash (1978, p.48) points out that Sackman has assessed the Delphi technique on the basis of "...highly developed standards pertaining predominantly to past conclusions and not future predictions," and Linstone (1978, p.297) says significant supportive research data was ignored by Sackman. Turoff (1975, p.100) points out that techniques like Delphi are to be viewed as aids to analysis, not as decision making devices. Coates (1975, p.193) claims that Delphi is not merely a way of "...drawing forth expert knowledge on expert's issues..." but also an "...aid to dealing with those most crucial contemporary societal problems: judgement and wisdom about the future."

To summarize, the strengths of the Delphi technique can be listed as follows:

- the use of a panel multiplies the intellectual effort which can be focused on an issue or problem;
- the reiterative rounds process allows panelists to reconsider their decision, and to adjust that decision if they wish;
- the panel can accommodate a very diverse and wide representation in its membership;
- the adherence to anonymity ensures that every member of the panel can contribute without fear of conflict and or intimidation;
- the technique allows a meeting of minds without necessitating travel and the associated expenses of time and money;
- the reiteration process helps facilitate a stable response which may not be possible in face-to-face meetings;
- the technique allows the generation of data, derived by a competent panel, when analytical data generation techniques are not appropriate;

- the reiteration process allows a comparison of responses between rounds, either quantitatively or qualitatively, which is not possible in single questionnaire surveys;
- the technique can serve as an educational medium for those taking part on the panel;
- the technique can facilitate an educated prognosis on developments in the future;
- the technique can be used to generate data which can assist with the making of decisions around which there may be little, or masses of, relevant information [e.g., resource allocation decisions];
- the technique has qualitative capabilities which can be used to explore issues and generate preliminary data, which can subsequently be investigated using quanitative research techniques;
- the technique has a sizable body of literature on its development and application;
- the technique has been in public use for over 25 years, and has been applied in a large number of studies in at least 30 areas, including education and higher education.

To summarize, the weaknesses of the Delphi technique can be listed as follows:

- the resultant data cannot be empirically validated immediately;
- the technique may not always produce a consensus or a stable response;
- the reiteration process may intimidate insecure panelists to change their previous decision;
- the question of expertness as it relates to panel membership is difficult to define;

- the technique lacks a theoretical framework which means little is known about its variables;
- the technique can be used incorrectly to produce a false consensus;
- the panelists may, when it is not called for, react to internal desires and not to external realities;
- the results produced by the technique cannot be generalized within a population if the panel has not been randomly sampled from that population;
- the technique prompts and necessitates closure of thinking on a topic, which may be premature;
- the technique necessitates a long-term commitment and the drop-out rate of panelists can be problematic;
- the practise of selecting a panel does not automatically mean that the individuals selected can make good prognostic decisions;
- an emphasis on consensus from the panel of participants can mask outlying but important opinion.

Overall, two polarized perspectives predominate. For those who view Delphi in a negative light it is seen as a technique which exhibits few of the standard aspects of traditional research methodologies – "...the conventional Delphi is basically an unreliable and scientifically unvalidated technique..." (Sackman, 1974, p.vi). For those who view Delphi in a positive light it is seen as a useful methodology which can be applied to gain prognostic knowledge about the future – "[i]t is in the questions of intuitive judgements, the marshalling of subconscious processes...that Delphi is useful and as such, one cannot judge it on the same basis as a concrete measurement" (Pill, 1971, p.62).

Panel of Participants and Questionnaires Used

The research question was addressed by individuals who are aware of the Ph.D. degree, its associated components, characteristics, and conventions. Moreover, as the degree is an international qualification, the research problem demanded the attention of a panel of participants comprised of cosmopolites, who have a national or international frame of reference (Gouldner, 1957), from Australia, Canada, Great Britain, and the United States. To ensure a range of perspectives, the selected panelists represented a broad cross section of those involved or associated with higher education. This decision was taken to avoid bias caused by encapsulation, a process which occurs within every discipline and profession, and which restricts the perspective of those practicing them (Royce, 1964). Evidence of this encapsulation process in higher education, and the restrictive outcomes associated with it, has been documented by Becher (1981) and Donald (1983).

Seventy-four individuals were contacted and 67 [AU 5, 1 female and 4 males; CA 13, 5 and 8; GB 9, 2 and 7; US 40, 7 and 33] participated in the study; all are, or have been, intimately involved with the Ph.D. degree acquisition process [Appendix I]. Although the literature indicates panels have ranged from less than 10 to several hundred, research shows that the average group error is, logically, greater with small panels. Dalkey (1969, pp.7-11) found that with one to nine members the error is highest, with nine to 15 members the error is lower, and with 15 to 23 members the average group error is lower again, with very little difference between 21 and 29 members. Beyond 25 it seems little benefit can be gained by increasing the size of the panel.

In keeping with the Delphi methodology all the participants on the panel were purposefully selected. A conventional random sample may not have brought together experienced individuals who are aware of problems and issues surrounding the Ph.D. degree. With respect to the numbers selected, an attempt was made to keep them in proportion with the number of institutions which offer the degree in each country. However, individuals who were in positions to make unique contributions were also included on the panel [e.g., Bottomly, Breslauer, Bryan, Chandler, D'Arms, Duhamel, Garcia, Gaudiani, Hughes, LaPidus, Wagner, Washington]. This decision to include unique individuals was made because holders of the degree can now be found in positions other than in the traditional academic role [e.g., board chairman, consultant, politician, polytechnic administrator, professional organization officer].

Although females are generally represented disproportionately low in universities, every attempt was made to ensure suitable females from the four countries were included on the panel. In one instance two males from the same university decided to participate [one had originally declined due to other commitments], but their doctorates are from different institutions so it was decided to accept their participation. As the University of London is a federated body of 39 schools, colleges, and institutions, it was felt that three panelists from separate affiliated bodies would not create any bias.

Travers (1969, p.199) claims the response for mail questionnaires used in educational research may not exceed 20 percent, even under favorable conditions. But, according to Huckfeldt (1972, p.16), the Delphi technique encourages a high response because of the professional interest of panelists who were purposefully selected. In the field of higher education Huckfeldt found the Delphi response rate exceeded 80 percent for single rounds, and that the final cumulative response rate was 94 percent. Regardless of these findings [the actual response rates in this study were Round 1 - 37 percent, Round 2 - 89 percent, Round 3 - 85 percent, cumulative response rate - 70 percent], reminder letters, which are known to increase the response (Leitner et al., 1979), and reminder telephone calls were used with every round of the study.

With respect to the questionnaires used, three options existed: first, open and unrestricted questions which would produce the widest range of data; second, open and restricted questions which would produce a controlled range of data [the restriction could be placed on the topics to be addressed or the number of relevant points to be defined in each answer]; and third, closed questions which would produce data controlled specifically by the answer options detailed in the questionnaire.

For this research the initial questionnaire was of the open and restricted type. Doyle (1974, p.7) states that a Delphi study initiated without a structure, "...where the panelists are requested to pose the questions in Round 1 is an interesting exercise in futility, which usually leads nowhere and requires four or five rounds to complete." By choosing open and restricted types of questions the panelists were given total freedom to respond, and the researcher was allowed to create a structure to limit the volume of data. As a format guide for the questionnaire, the Delphi instrument of Nadeau et al. (1989) was used, and the works of Huckfeldt (1972) and Doyle (1974) were studied.

After preliminary feedback from colleagues of the researcher, a draft questionnaire was directed to four panelists [one from each country] and their feedback, collected by telephone, was noted. Then, together with a request letter [Appendix J], the pretested Round 1 questionnaire [Appendix K] was directed to the prospective panel. The structure of the questionnaire was based on the literature which revealed the Ph.D. degree has three fundamental components, and accordingly, the questionnaire addressed each of these components. Specifically, the panelists were asked to define qualitatively the three issues which they believed are, or may be, the most problematic with respect to each of the three fundamental components of the degree. Responses to this questionnaire constituted Round 1 of the study.

To derive the Round 2 questionnaire the data obtained through Round 1 was reviewed. All issues raised were tabulated and totaled, and the associated country of origin of every issue identified was recorded. For each of the three fundamental components, several issues were selected and incorporated, in the form of 18 questions, into the Round 2 questionnaire. How this selection occurred was based on two criteria: the frequency with which an issue was raised, and validation with the recommendations specified in the prescriptive literature published between 1960 and 1988. To be selected for the Round 2 questionnaire an issue must have been identified by at least two panelists, and the issue must have appeared in Table 3 [p.44] and Table 4 [p.85]. Why these criteria were applied was to ensure the study addressed consistent and/or widespread problematic issues, not issues relevant to one individual or issues relevant only at one point in time.

The relationships between the questions posed on the Round 2 questionnaire [Appendix L] and the problematic issues [Table 4] raised in the responses to the Round 1 questionnaire were as follows: questions 1,2, and 3 correspond with the issue 1 "what is appropriate doctoral research"; question 4 corresponds with issue 3 "faculty advising/ directing/supervising"; question 5 corresponds with issue 5 "quality of writing in theses"; question 6 corresponds with issue 2 "purpose of study/courses"; question 7 corresponds with issue 4 "breadth/content/ depth/scope of thesis not adequately defined"; question 8 corresponds with issue 9 "time to complete thesis"; question 9 corresponds with issue 8 "alternatives to thesis"; question 10 corresponds with issue 7 "study of research methods"; question 11 corresponds with issue 10 "part-time students"; question 12 corresponds with issue 6 "financial support"; question 13 corresponds with issue 11 "length of thesis"; question 14 corresponds with issue 14 "time to complete entire degree"; question 15 corresponds with issue 15 "creativity in thought restricted"; question 16 corresponds with issue 13 "interdisciplinary emphasis"; question 17 corresponds with issue 19 "failure to provide teacher training"; question 18 corresponds with issue 16 "research not 'collaborative'." Three issues [12,17,18] were not addressed based on the criteria described in the preceding paragraph. With respect to correspondence between the issues, which were not stated exactly the same way by the panelists in Round 1, and the questions, the issues were used as guides for questions not as limiting conditions.

Answers were requested on a seven point Likert scale similar to those used by Fazio (1985) and Huckfeldt (1972) in their research which incorporated the Delphi methodology. The process used to pretest the Round 1 questionnaire was also used for the Round 2 questionnaire. It was assessed locally then directed to four panelists [one in each country] with their responses being collected by telephone.

In accordance with the methodology, the questionnaire for Round 3 [Appendix M] was based on the responses to Round 2. Separate statistical summaries for every answer given by each of the panelists were prepared. Each summary included the panel's interquartile range, the panel's median response, and the individual panelist's response. Panelists were asked the same questions, as were posed in the Round 2 questionnaire, and to "...reconsider all of your previous responses in light of the panel's responses." In some studies which used the Delphi methodology participants have been asked to give reasons for their responses. However, Dalkey (1969, p.59) found this process "did not increase the accuracy of initial estimates or produce greater improvement on iteration." Reasons given provided insight into the thinking behind the responses but did not enhance subsequent responses. This finding was confirmed later by Lonsdale (1975). Consequently, in this study, panelists were not asked to qualify their responses to Rounds 2 and 3.

Validity and Reliability

As Hammersley (1987) points out, reliability and validity have been defined in numerous different ways. The Delphi technique has been described by Barrington (1986) as a naturalistic [qualitative] evaluation tool, and for the research recorded in this thesis, reliability and validity were confirmed using qualitative research standards. This step was taken because the more traditional research standards were not considered appropriate to the methodology (Hesseling, 1986, p.117; Guba and Lincoln, 1989, pp.156-183).

In relation to the findings of qualitative research, the issue of trustworthiness and its associated elements have been addressd by Guba (1981). He believes new terms are required when working with qualitative methods as the more traditional qualitative terms are not in harmony with the naturalistic paradigm. Lincoln and Guba (1985, p.219) have summarized some of these terms as follows: credibility [in place of internal validity], transferability [in place of external validity], and dependability [in place of reliability]. These elements as they relate to the study are subsequently discussed.

To confirm credibility [internal validity] of the Round 1 data, the findings were triangulated with the prescriptive literature. Triangulation is the process whereby data is checked for similarity with another source (Denzin, 1988, p.512). With respect to this process Webb et al. (1966, p 3) write, "[o]nce a proposition has been confirmed by two or more measurement processes, the uncertainity of its interpretation is greatly reduced. The most persuasive evidence comes through a triangulation...." It was found that the problematic issues as defined by the panel in Round 1 were almost identical to the recommendations within the prescriptive literature, published in the four countries between 1960 and 1988. From this finding it was concluded that all major problematic issues were identified, and only they would be incorporated into the identical Round 2 and Round 3 questionnaires.

Looking at transferability [external validity], it is to be noted that the study as recorded here was undertaken to answer the research question as posed within the conceptual framework discussed in Chapter III. The study was not undertaken to provide statistical data which could be transferred or generalized to other countries or institutions. On this point Lincoln and Guba (1985. p.298) state, "...that if there is to be transferability, the burden of proof lies less with the original investigator than with the person seeking to make an appplication elsewhere." Patton (1990, p.489) uses the word extrapolation with respect to external validity and says, "[e]xtrapolations are modest speculations on the likely applicability of findings to other situations under simlar, but not identical conditions. Extrapolations are logical, thoughtful, and problem oriented rather than statistical and probabilistic."

Of course the fact the study was international also effects transferability, because each of the countries represented has its own educational history, culture, and infrastructure. The adoption of an innovation based on the findings, to address problems associated with the Ph.D. degree, may result in outcomes which are different educationally, institutionally, and politically in the four countries. It was therefore concluded that as no university and its milieu can be considered a constant with the status quo remaining static, it was unrealistic to seek transferability in any long-term or specific case. Any use of the data would require consideration be given to unique local, regional, and national variables, as Lincoln and Guba, and Patton have suggested above. Hence the research question was not framed within a specific time-limit [e.g., effect within 10 years], and panelists were asked to give their personal opinions [i.e., "...define the issues which you believe...."] not an institutional or national opinion. To ask questions related to specific universities or countries, or to stipulate a time frame was considered inappropriate and of marginal value.

Dependability [reliability] of the final results was a major concern in this study. Lincoln and Guba (1985, p.299) point out the necessity for researchers to be wary of "...factors of instability and factors of phenomenal or design induced change," and a method of measuring dependability was therefore deemed essential. An accepted method is the stability measurement computation and it was used accordingly. By asking the same questions in Round 3 as were asked in Round 2, the study incorportated a reiterative group stability process, the results of which were calculated to have an acceptable degree of dependability. This finding is supported in the literature. Helmer (1983, p.153) and Weatherman and Swenson (1974, p.109) point out that in Delphi studies virtually all of the changes in opinion occur in the first few rounds, and nothing is achieved by continuing the process. On looking at the findings of this study, it was concluded that the panel's response was acceptably consistent and stable at the end of the third round, which meant no further rounds were necessary.

As Helmer (1968, p.116) notes, many of the elements involved in projecting future developments are not amenable to quantification, and the "...opinions of experts must be combined in some meaningful way so that their collective knowledge and judgements can be brought to bear." Working within the conceptual framework described in Chapter III and using the Delphi technique, a meaningful process was adhered to based on the validity and reliability which were confirmed as described above.

Summary

The Delphi technique was first announced publicly in 1962 [it had been developed for military purposes in the early 1950s]. Since then it has been applied in over 30 different fields of research including higher education. It is a process by which the collective intellect and experience of a knowledgeable panel can be brought to bear on a problem. What these individuals provide, which is also the reason they are deliberately selected to participate on a Delphi panel, is the ability to work intellectually on an issue with which they have experience. In Johnston's (1970, p.178) words, the individuals work with both "hard" and "soft" data, and through a process of iteration a stable response can be derived.

The validity and reliability of the questionnaires used in this research were assessed based on qualitative research standards, which showed the credibility, the tranferability, and the dependability to be acceptable. As a qualitative research methodology Barrington (1986, p.87) makes the point that, "[t]raditional arguments about the lack of rigor of the Delphi have been largely dispelled by a shift from the scientific to the naturalistic paradigm...."

The panel of participants represented a rich array of competence and experience. All are professionals, and all are aware of the Ph.D. degree and its components. There is no reason to suspect that any of them responded in a way other than in an honest and forthright manner.

Citing Dalkey's (1969) work on Delphi, Pill (1971) states there are two options available to researchers if they are working on a problem under the following conditions:

> Under conditions of uncertainity with insufficient data, incomplete theory, and a high order of complexity: "we can either wait indefinitely until we have an adequate theory enabling us to deal with...problems as confidently as we do with problems in physics and chemistry, or we can make the most of an admittedly unsatisfactory situation and try to obtain the relevant intuitive insights of experts and then use their judgements as systematically as possible. The use of the Delphi approach represents an effort along the second of these alternatives" (p.61).

As a methodology, Delphi meshes well with the conceptual framework used and the research question posed. This combination of quantitative [theoretical framework] and qualitative [methodology] paradigms is supported by Husén (1985, p.4,338) who claims there is a need for pluralism in research approaches, and Howe (1985, p.16), who is of the opinion these paradigms are not incompatible, and to use both is epistemologically sound. Linstone and Turoff (1975, p.7) state that Delphi provides panelists with the greatest measure of freedom, and this unfettered intellectual power was needed to define and assess the real [not speculative] problems related to the degree. The panel's prognoses, given within the conceptual framework of the Ph.D. acquisition model, provided data that is not available within the atheoretical prescriptive literature. These findings and their associated analyses are presented in the following chapter.

V

FINDINGS AND ANALYSES

Problematic Issues [Round 1]

The Round 1 questionnaire was directed to 74 prospective panelists, and responses were received from a total of 27 [8 female, 19 male], from Australia, Canada, Great Britain, and the United States. Of the 232 problematic issues related to the Ph.D. degree which were recorded [Appendix N] by the panel, 211 of these are listed into 19 distinct groups in Table 4. Twenty-one single issues that were recorded only once were not incorporated into the research [Appendix O].

By far the most frequent issue identified was the problem of what constitutes appropriate doctoral research. Comments such as, "goal of Ph.D. study not agreed upon [AU]," "interest and relevance [CA]," "new facts over an interpretation [GB]," and "too much stress on originality [US]," were some of the 38 problematic issues recorded in this research related grouping.

A lack of a clear stated purpose for the required/proposed studies was a problematic issue identified 27 times. Opinions such as "how much study is required? [AU]," "courses do not seem to be of any use to the proposed research [CA]," "prescribed courses do not meet the research training needs of the student [GB]," and "excessive course requirements [US]," were recorded.

The issue of faculty advising/directing/supervising formed the third largest grouping. This issue was identified 26 times as being a problem with respect to the Ph.D. degree. Comments such as, "supervisors and students fail to define sensible and manageable projects which can be completed [AU]," "supervision is too permissive

Table 4: Problematic issues tabled by frequency and country of origin as defined in Round 1 by panel of participants

	COMPONENT*	PROBLEMATIC ISSUE	FREQUENCY	COUNTRY AU	CA	GB	US
1.	R	what is appropriate doctoral research	38	X	X	X	X
2.	S	purpose of study/courses	27	X	X	X	X
3.	SRT	faculty advising/directing/supervising	26	X	X	X	X
4.	T	breadth/content/depth/scope of thesis not adequately defined	18	X	X	X	X
5.	T	quality of writing in theses	16	X	X	X	X
6.	SRT	financial support	12		X		X
7.	S	study of research methods	11	X	X	X	X
8.	RT	alternatives to thesis	10	X	X		X
9.	T	time to complete thesis	8	X	X	X	X
10.	SRT	part-time students	8	X	X		X
11.	T	length of thesis	8	X	X		X
12.	S	insufficient suitable courses	5	X	X		X
13.	SR	interdisciplinary emphasis	5		X		X
14.	SRT	time to complete entire degree	4	X	X	X	X
15.	R	creativity in thought restricted	4	X			X
16.	R	research not "collaborative"	4				X
17.	R	practical component	3		X		X
18.	S	foreign languages needed	2				X
19.	S	failure to provide teacher training	2				X
TOTAL			211				

* S Issue related to lengthy study component of Ph.D. degree
R Issue related to original research component of Ph.D. degree
T Issue related to thesis preparation component of Ph.D. degree

[21 single problematic issues were recorded in Round 1, Appendix O]

[CA]," "poor staff understanding [GB]," and "professors prolong the process because of overwhelming concern about total perfection [US]," were typical comments in this group of responses.

The issue of the thesis was identified as a problem 18 times. More specifically, the breadth, the content, the depth, and the scope of the thesis are not considered to be defined adequately. Problems such as "the standards by which theses are to be judged are incredibly vague [AU]," "a committee of professors who may have different notions of what constitutes a thesis [CA]," "reducing the scope of a thesis to a manageable size [GB]," and "preparation for a career versus a magnus opus [US]" were identified.

The poor quality of writing [grammar, punctuation, syntax, etc.] in theses was identified 16 times. Statements from panelists included, "theses are not well edited [AU]," "program should include an introduction to ways of becoming a published author [CA]," "pretentious jargon [GB]," and "students have not learned to write cogently and succinctly [US]."

Inadequate emphasis on research methods is perceived to be a problem in Ph.D. programs. Eleven responses were received on this issue and they included the comments, "students would benefit from structured and coherent instruction in research methods early in their program [AU]," "not enough coursework on methodology [CA]," "choice and understanding of research methodology [GB]," and "exposure to a range of research methods and their relationship to outcomes [US]."

Long completion time for the thesis was an issue recorded eight times. Respondents stated problems existed with "the minimum and maximum amount of time allowed for the thesis to be completed [AU]," "an inordinate amount of time is spent writing the thesis [CA]," "lack of guidance on time [GB]," and with the "completion time permitted [US]."

Another perspective of this problem could be seen in the four responses which identified completion time for the entire Ph.D. degree as a problematic issue. This was identified through comments such as, "ensuring that completion times are not excessive [AU]," "length of time taken to complete the requirements [CA]," "three years maximum recommended [GB]," and "keep study within reasonable time limit [US]."

All of the above issues were identified as problems in Australia, Canada, Great Britain, and the United States. What follows are four problematic issues which were recorded in at least three countries.

Except in Great Britain, the lack of an alternative to the traditional thesis was seen as a problematic issue, by 10 respondents. This group indicated that "students attempting Ph.D.s in areas of study which do not have a research tradition or in interdisciplinary areas should not be expected to earn a degree by research only [AU]," "options in lieu, e.g., a supervised practicum [CA]," and "is the preparation of a dissertation a waste of time in fields where publication is in the form of short articles? [US]."

Part-time study, that is study which does not constitute a principal activity is a problematic issue. It was identified in eight responses, and comments received included, "whether it is possible to complete part or all of the degree by correspondence [part-time] study [AU]," "lack of opportunity to take courses part-time [CA]," "nature of research for part-time students [US]."

Overly long theses were mentioned eight times by panelists. Related comments included, "theses are too long [AU]," "many theses are unnecessarily long [CA]," and "does a prescribed length only encourage irrelevance and bloated organization [US]?"

The availability of suitable Ph.D. degree level courses is considered a problem. Five members of the panel indicated that sufficient courses were not available and that this was "particularly difficult for schools with small numbers of doctoral students [AU]," "due to perception held by professors there are no rewards [CA]," and in "conflict with other heavily subscribed courses [US]."

All of the following groupings incorporated issues which were identified as problems in either two countries or one.

Financial support to undertake the study for a doctor of philosophy degree and the related research was an issue identified 12 times in Canada and the United States. Respondents said there was "inadequate financial support [CA]," and that "available financial support controls areas of research [US]."

Interdisciplinary study and research is a problem according to five panelists. They said that there are "difficulties in doing interdisciplinary research [CA]," and that there is "insufficient interdisciplinary emphasis [US]."

Four comments were associated with the lack of creativity. Comments included "conservative effects of the study component [AU]," "novelty of the research is an important factor [US]," "lack of self-directed research [US]," and "traditional teaching does not force or allow the student to use creativity and or thinking skills [US]."

Problems arising from the acceptance and the non-acceptance of group or team thesis research were raised by four panelists. They said there is a "bias to large lab group research in many fields [US]," and that there is "too much stress on individual research, too little provision for team research especially in the humanities and social sciences [US]."

The lack of practical [real world or industry] experience as part of the Ph.D. degree was identified as a problem three times. One panelist stated that "in professional areas there should be some practicum associated with the Ph.D. requirements [CA]," and another said "practica are needed [US]."

With respect to languages two respondents believe a problem exists. In their words, there is "too little use of foreign languages as research tools [US]," and doctoral students need either "linguistic or analytical skills [US]."

Not incorporating teaching into the doctor of philosophy degree program is a problematic issue, according to two panelists. For them doctoral programs fail "to prepare undergraduate teachers [US]," and students need to be "exposed to formal experiences dealing with teaching in their disciplines and in higher education [US]."

Overall, the issues identified by the panel were not unanticipated. By comparing these issues related to the Ph.D. degree, with the recommendations made in the prescriptive literature [Table 3], it can be seen that there are few differences. Only three issues, insufficient suitable courses, need for foreign languages, and lack of collaborative research were not listed in the prescriptive literature table. This comparison [triangulation] with, and the similarity between, the two tables demonstrates the credibility [internal validity] of the problematic issues identified by the panel of participants. It must be noted here that this identification was made by female and male members from each of the four countries. No evidence existed to suggest that all of the major problematic issues were not identified. Therefore founded on this, the issues identified in Table 4 were considered the only issues on which the Round 2 questionnaire should focus.

Iterative Process [Rounds 2 and 3]

Sixty-six of the 67 panelists who took part in the study completed and returned the Round 2 questionnaire. Summary statistics were prepared for each of the 18 questions. These statistics included the median response of the panel, the interquartile range of 25 percent [approx.] to 75 percent [approx.] of the panel, and the individual panelist's response; an explanation of these summary statistics was included with the Round 3 questionnaire. It used the same 18 questions as were used in Round 2, but each panelist received a questionnaire that had been prepared specifically for them as each questionnaire listed data pertinent to each panelist; and, although the 18 questions used in Round 2 were pretested, four panelists indicated they were unsure of the meaning of question six ["Defining the reason for, the extent of, and the method of mandatory study."], and therefore in Round 3 question six was modified ["Define the reason for, the extent of, and the method of mandatory/required study/courses."]. No further queries were received.

Similar to the procedures used in Rounds 1 and 2, all panelists who had not replied in a reasonable time received a reminder letter then telephone call[s] to maximize the Round 3 response. Sixty-three panelists [95 percent] eventually completed and returned the Round 3 questionnaire. The difference in the number of questionnaires completed between Round 2 and Round 3 was three [2=66, 3=63]. Attempts to locate the three "missing" questionnaires [GB=1, US=2] were unsuccessful.

For the purpose of subsequent statistical analyses, it was assumed that these three missing questionnaires contained changes for all of the 18 questions. Assuming this and on calculating the stability measurement computations for each of the 18 responses, it was found that three of the responses [1,7,15] were unstable because the computations exceeded the maximum permissible figure of 15 percent [1=16.7 percent, 7=16.9 percent, 15=16.9 percent]. For two reasons it was decided that no additional round[s] would be undertaken, and that the Round 3 data would be accepted as the final prognoses of the panel of participants. First, the financial cost [approximately $250 per mail-out and six mail-outs had already been conducted] of undertaking another round requiring two mail-outs was prohibitive. Second, the real possibility that in any later round[s] more questionnaires would go missing.

All data were analysed after reducing the seven point response scale to three categories [negative, no effect, positive]. This was done because the study necessitated an assessment of the effects of hypothetical actions, but not an assessment of the magnitude of these effects, and because of the very small number of panelists from Australia [5]. Nevertheless, all responses to the seven point scale in Round 3 are included in Table 5 [aggregated response] and they are discussed in the following section.

Table 5: Stability data and summary statistics for Round 3

		RATINGS [bold highest score]								FREQUENCY [%]		
QU	SMC %*	1	2	3	4	5	6	7	PANEL	-VE**	NE	+VE
1.	16.7#	2##	2	8	4	10	**20**	17	63	19	6	75
2.	10.5	3	3	11	6	13	**20**	6	62	27	10	63
3.	8.7	12	**25**	14	1	9	1	1	63	81	2	17
4.	10.3	0	0	0	0	4	21	**38**	63	0	0	100
5.	7.1	0	2	2	3	15	**25**	16	63	6	5	89
6.	10.8	0	1	2	16	16	**17**	8	60	5	27	68
7.	16.9#	0	0	1	4	15	**30**	12	62	2	6	92
8.	12.3	4	9	15	**16**	9	5	3	61	46	26	28
9.	13.5	6	**17**	6	8	11	13	2	63	46	13	41
10.	11.9	0	1	1	11	**23**	**21**	6	63	3	17	79
11.	10.3	4	6	6	8	**17**	15	7	63	25	13	62
12.	12.1	1	1	0	8	10	**26**	16	62	3	13	84
13.	11.9	3	7	9	**20**	12	9	3	63	30	32	38
14.	13.7	5	8	14	**18**	13	2	2	62	44	29	27
15.	16.9#	4	6	9	9	**16**	12	6	62	31	15	55
16.	11.9	0	0	2	9	13	**25**	14	63	3	14	83
17.	10.3	6	3	3	13	**20**	11	7	63	19	21	60
18.	13.5	9	13	5	7	**18**	8	3	63	43	11	46

* Stability measurement computation is indicated by percentage. Less than 15.0% indicates the panel's response is stable.

** -VE means negative, NE means no effect, +VE means positive.

Exceeds 15.0% when it is assumed all missing Round 3 questionnaires contained changes for all 18 questions.

## Only those responses from panelists who answered Round 3 are tabled. As 3 questionnaires were not received and as not all panelists responded to all questions, the panel or actual number of responses does not equal the total number of participants [67].

Through the iterative process of Rounds 2 and 3 the dependability/reliability of the data was confirmed. As mentioned above the stability measurement computations determined that the majority of the responses to the Round 3 questionnaire were stable [i.e., less than 15 percent difference betweeen responses to consecutive rounds], and although another round was desirable it was deemed inadvisable. [Here it is important to note the Delphi technique is dissimilar to the Policy Delphi. The latter research methodology uses some of the same procedures but it seeks elucidation of divergent responses and exploration of alternatives (Cookson, 1986, p.5) and normally generates more rounds.] A full summary of the responses and the changes in the responses for Rounds 2 and 3 is provided in Appendix P.

Exactly what this response stability shows is not clear. It may indicate that the members of the panel have fixed and unyielding opinions, or it may indicate similar perspectives held by a group of individuals who have previously pondered on similar hypothetical actions. One thing that it suggests, which would give additional credit to the composition of the panel, is that the members of the panel may not be prone to inconsistent and erractic decision making.

As detailed in Chapter IV every effort was made to select individuals who could make sound judgements with respect to hypothetical amendments to the fundamental components of the Ph.D. degree. The panel of participants was chosen deliberately and those selected did not represent the four countries, which therefore precluded the use of inferential statistics. The doctorate is an international qualification and in this study it was viewed from that perspective, it was not the intent of the research to test for differences between countries. But because of the exploratory nature of this research, it was thought an assessment of possible differences between countries may shed some light on the acquisition process and stimulate further research questions. Consequently, some analyses were conducted and they are discussed in the following section and are listed in Table 6 [dis-aggregated response].

Final Prognoses of Panel of Participants

Because the responses in Round 3 were accepted as sufficiently stable, the responses were considered the final prognoses of the panel. It was not the intent to ascertain if the action, as reflected in each question, would be the correct action to take to improve the doctor of philosophy degree. Comparisons of alternate courses of action and probabilities need to be addressed in future research.

For all the questions posed the intent was to ascertain the outcome, either negative [-ve], or no effect [ne], or positive [+ve], on the doctorate. For each of the 18 questions the prognostic response to, "[w]hat effect will the action, described in each of the following statements most likely have on the Ph.D. [or D.Phil.] degree?" is as follows. All percentages are rounded and they reflect the number of panelists who answered Round 3.

QUESTION 1. "Insisting the priority of doctoral research is to add to knowledge [i.e., original contribution]." The majority of the panel [75 percent] were of the opinion that this action would have a positive effect on the doctor of philosophy degree. Only a small number of the respondents [6 percent] thought this action would have no effect on the resultant degree. From Table 5 the highest score is clearly a positive

Table 6: Country and combined response frequencies [%] for Round 3

	COUNTRY												COMBINED		
	AU[5*]			CA[13]			GB[7]			US[38]			[total**]		
QU	-VE#	NE	+VE	-VE	NE	+VE	-VE	NE	+VE	-VE	NE	+VE	-VE	NE	+VE
1.	60	0	40	7	7	86	14	14	71	18	5	76	19	6	75
2.	20	0	80	48	4	48	43	29	29	18	8	74	27	10	63
3.	100	0	0	77	0	23	100	0	0	76	3	21	81	2	17
4.	0	0	100	0	0	100	0	0	100	0	0	100	0	0	100
5.	0	20	80	15	0	85	14	0	86	3	5	92	6	5	89
6.	0	0	100	0	15	85	0	0	100	5	42	53	5	27	68
7.	0	0	100	0	0	100	0	0	100	3	11	86	2	6	92
8.	40	20	40	15	31	54	57	29	14	55	24	21	46	26	28
9.	40	40	20	62	0	38	57	0	43	40	16	44	46	13	41
10.	0	20	80	0	15	85	0	0	100	5	21	74	3	17	79
11.	20	0	80	31	8	61	14	0	86	24	18	58	25	13	62
12.	0	20	80	0	23	77	14	0	86	5	13	82	3	13	84
13.	20	0	80	23	46	31	29	29	43	34	32	34	30	32	38
14.	40	0	60	23	46	31	57	29	14	47	26	26	44	29	27
15.	40	0	60	23	23	54	29	0	71	32	16	53	31	15	55
16.	0	0	100	8	16	76	0	0	100	3	18	79	3	14	83
17.	20	40	40	16	31	53	86	14	0	8	16	76	19	21	60
18.	0	20	80	62	23	15	29	14	57	47	3	50	43	11	46

* Actual number of panelists who participated in Round 3.
** Frequency in percent of total panel combined.
# -VE means negative, NE means no effect, +VE means positive.

effect, and this is also reflected in the data for Canada, Great Britain, and the United States as compiled in Table 6. Three of the five Australian panelists believed a negative effect would be the outcome, but care needs to be exercised when considering such a small number of panelists.

QUESTION 2. "Insisting the priority of doctoral research is to enhance learning [i.e., research training]." Similar to question one, the majority [63 percent] of the panel believed the result of this action would cause a positive effect on the doctorate. Approximately one quarter [27 percent] of the panel held a negative opinion. For this question the individual country answers were dissimlar to the previous question. Table 6 shows that the majority of panelists from Australia and the United States predict a positive outcome, but the Canadian panelists expressed an ambiguous result and those from Great Britain a negative impact. It is puzzling why British panelists produced such a high no effect response [29 percent] when they are compared with the other three national groups.

On reflection questions one and two are in conflict. From the overall positive response for both questions, it is interpreted that an original contribution and research training are both valued as part of doctor of philosophy degree programs. However, as options, both cannot be the priority for a program. It would have been more revealing to place each option at the end of the seven point scale and thereby ascertain which is considered the most desirable. From Tables 5 and 6 both options are obviously valued, but it is impossible to say which is considered the most important. Once the preference is determined later research could focus on that preference.

QUESTION 3. "Insisting that doctoral research be 'basic' or 'pure,' not 'applied' or 'practical'." Fifty-one of the 63 respondents [81 percent] believed that this action would have a negative impact on the resultant doctorate, whereas only eleven [17 percent] thought the impact would be positive. In Canada and the United States, the negative responses of 77 percent and 76 percent respectively were slightly counterbalanced by the positive responses of 23 and 21 percent. This suggests that the Ph.D. degree should not be considered strictly an academic research doctorate only, but rather a doctorate which can be acquired through applied or practical research.

QUESTION 4. "Improving the advising, directing, or supervising of doctoral students." Clearly the panel response was in the affirmative. Thirty-nine panelists [60 percent] responded that this action would most likely have a strong positive impact on the Ph.D. degree. The remaining panelists [40 percent] indicated a weak or moderate positive effect would be the outcome. This question was the only question for which no panelist in any of the four countries indicted either a neutral or negative effect. There is no doubt that all the panelist believe the Ph.D. degree will be enhanced if improvements in the relationship between student and advisor/director/supervisor are brought about.

QUESTION 5. "Requiring all doctoral students acquire writing skills before they write their theses." Only four panelists [6 percent] indicated that this action would have a negative result on the Ph.D. degree. Whereas 56 panelists [89 percent] indicated that a positive effect would be the outcome. Table 6 shows that all of the positive responses for each ocuntry are either equal to or exceed 80 percent, and the negative responses are 15 percent or less. There is no ambiguity in the panel's response. Improving the writing skills of doctoral students/

candidates is seen by the majority of the panelists as a way of improving the doctor of philosophy degree.

QUESTION 6. "Defining the reason for, the extent of, and the method of mandatory/required study/courses." A majority [68 percent] of those answering this question responded that the doctorate would be improved by this action. Three replies [5 percent] indicating negative prognoses were received, and the other 16 replies [27 percent] indicated no effect. Looking at each country the positive response pattern holds except for the United States, where 47 percent of the panelists predicted the action would have either a negative or no effect. Care needs to be taken when analysing data of this type, because the panelists bring their own point of reference to their decision making. Reason, extent, and method all mean different things to different people operating in similar but different higher education systems.

QUESTION 7. "Clarifying the standards for preparing and evaluating the doctoral thesis." From Table 5 only one panelist [2 percent] recording a negative consequence, whereas four [6 percent] recorded no effect and the majority of 57 panelists [92 percent] recorded a positive prognosis. A very prominent response of six [moderate positive effect] was recorded. From Table 6 the individual country response pattern was the same for Australia, Canada, and Great Britain all of which recorded positive responses only. A small number of panelists [14 percent] from the United States, however, did record either no effect or negative responses. Almost as pronounced as the response to question 4, the response to question 7 confirms a weakness in the Ph.D. acquisition process and what might be done to improve this weakness.

QUESTION 8. "Decreasing the time allowed to write the thesis." Overall, a deleterious outcome was predicted, with only 17 of the panelists [28 percent] indicating the action would have a positive effect on the degree. Whereas 28 of the panelists [46 percent] predicted a negative outcome, and of these, 13 thought the outcome would be moderately or strongly negative. The remaining 16 respondents [26 percent] were of the opinion the action would have neither a positive nor a negative effect on the resultant doctorate. The pattern of the responses for the four countries was the same except for Canada. Table 6 reveals that Canada was the only country where the positive prognosis exceeded the negative or no effect prognoses, which is the opposite of Great Britain and the United States. Once again care needs to be observed when considering the small number of responses from Australian panelists, and when assessing countries that may have different existing norms with respect to the time allocated to complete the thesis.

QUESTION 9. "Approving alternatives to the traditional thesis [e.g., a book or journal articles]." The response to this question produced a pronounced difference in thinking. Although almost half [46 percent] of the respondents foresee the action having a negative impact, over one third [41 percent] foresee a positive impact resulting. Both the moderately negative effect and moderately positive effect garnered the most support, with over one quarter [27 percent] and approximately a fifth [21 percent] of the respondents supporting each respectively. Just under 13 percent indicated the action would have no effect. Although Table 6 shows that Canadian panelists generally thought the same as the panelists from the other countries, there was a difference in the magnitude of their response. Like their colleagues, Canadian panelists recorded a bi-modal response but their prognoses reflected the most pronounced difference between the negative and positive. This question has obviously produced an ambiguous response. For an improved Ph.D. degree it may be advantageous to have an "option" which could be substituted for the traditional thesis.

QUESTION 10. "Increasing the emphasis placed on the study of research methods." Eleven [17 percent] of the panelists indicated the action would have no effect on the doctorate. Of the remaining respondents, 50 [79 percent] believed the action would enhance the resultant degree, and only two [3 percent] indicated that a negative result would occur. Similar to questions 4,5,6,7,12, and 16, this question resulted in a very small negative response. All of the separate response patterns for the four countries mentioned were similar. Table 6 shows a consistent pattern of a small or non-existent negative prognosis, a small or non-existent no effect prognosis, and a large positive prognosis. Of the four countries, Great Britain was the only one to show a totally positive prognosis. Once again the interpretation of the data needs to be undertaken cautiously, as all of the panelists apply unique perspectives when answering this type of question.

QUESTION 11. "Permitting and facilitating the attainment of all components of the degree by part-time students." Table 5 shows this question resulted in an overall response which was positive. Thirty-nine [62 percent] of the panelists indicated a positive answer, compared with 16 [25 percent] who indicated a negative answer. Eight panelists [13 percent] indicated there would be no effect on the resultant degree.

Table 6 shows that of all the individual country reponses, that for Great Britain revealed the strongest positive prognosis for the resultant Ph.D. degree. Eighty-six percent of the panelist from Great Britain indicated the doctorate would be improved, compared with 80 percent of Australian panelists [n.b., four panelists only], 61 percent of Canadian panelists and 58 percent of panelists from the United States. The concept of part-time is difficult to circumscribe because of the independent nature of most doctoral work, and caution is necessary when analysing related data.

QUESTION 12. "Ensuring all doctoral students receive a stipend and/or funds to conduct their research." Clearly in the affirmative, 52 responses [84 percent] showed a positive effect with respect to the resultant doctorate. Those who believed this action would have no effect on the degree totaled eight [13 percent]. A consistent pattern of responses to this question is revealed in Table 6. Only the response from the British panelists deviates slightly from the other countries by not recording a no effect prognosis. Nevertheless, over 75 percent of the respondents from each of the countries predict a positive outcome for the resultant doctorate. As confirmed recently by the Council of Graduate Schools (1991, p.19) in the United States, financial difficulty is a major stumbling block to completing the doctoral program. The provision of stipends and/or funds may help overcome this hindrance.

QUESTION 13. "Requiring the written thesis be shorter than the existing norm [i.e., fewer pages]." The modal value for this question was four [no effect] with 20 panelists [32 percent] believing the action would have no impact on the degree. Although more of the panelists [38 percent] thought the result would be positive, an almost equal number [30 percent] thought this action would be negative. This overall ambiguous response to the question is reflected in all of the individual country responses displayed in Table 6. The one exception is Australia, which although like the others shows an ambiguous response it has a greater imbalance, but the small number of panelists must be recalled. There appears to be no obvious solution to the problem of the too long doctoral thesis. Further research is needed to investigate all points of view relevant to this problem with the Ph.D. degree.

QUESTION 14. "Decreasing the time allowed to complete all components of the degree." Similar to the response to question 13, the modal value for this question was four [no effect], and 18 panelists [29 percent] indicated this answer; a no effect percentage exceeding 25 was also given for questions 6,8, and 13. Of the other respondents, 27 [44 percent] predicted a negative outcome and 17 [27 percent] were of the opinion that the action would be positive. Panelists from Great Britain and the United States responded in a similar manner with the negative prognosis being dominant. Whereas in the responses from the Australian and Canadian panelists, the positive effect and the no effect outcome were predicted for the doctorate. An interpretation of this data in Table 6 needs to be undertaken with caution because each country has existing norms with respect to the completion of the Ph.D. degree. All of the panelists bring their own perspective to this type of question.

QUESTION 15. "Accepting 'creative' approaches to research [i.e., novel in lieu of traditional approaches]." A majority of 34 panelists [55 percent] believed that the outcome of this action would be positive.

At the other end of the continuum, 19 panelists [31 percent] thought a negative situation would develop. The one national body of panelists that responded differently as a group to this question were those from Great Britain. For Canada and the United States, Table 6 shows a full range of responses [negative, no effect, and positive] with Canada having the greater response range, positive to negative, of 31 percent. Great Britain on the other hand shows a response range of 42 percent, and all responses are either negative or positive with no panelist having predicted no effect on the resultant doctorate. Like their colleagues in Canada and the United States, the response from the five Australian panelists had a range smaller than the British response. With a degree that is over 700 years old, the values associated with long-established traditions will most likely make the acceptance of creative approaches to Ph.D. degree research problematic.

QUESTION 16. "Approving interdisciplinary study." Table 5 shows that similar to questions 4,5, and 7, question 16 produced a predominantly positive response [83 percent]. Only 2 panelists [3 percent] thought the action would cause a negative effect. Table 6 shows that the panelists from Australia and Great Britain recorded positive prognoses only, whereas some panelists from Canada and the United States predicted the action would have negative outcomes, and others predicted the action would have no effect on the resultant Ph.D. degree. Whether there is a significant difference between Great Britain and North America with respect to the perceptions of and approaches to interdisciplinary doctoral work needs to be investigated. The strong positive response given by the British panelists causes one to question the positions taken by the panelists from Canada and the United States, and vice versa.

QUESTION 17. "Incorporating teacher training into the degree [i.e., teaching doctoral students how to teach]." From Table 5 it can be seen that 38 [60 percent] panel members recorded a positive outcome, whereas 12 members [19 percent] thought there would be a negative effect. Breaking this data into separate countries, Table 6 shows that the panelists from Great Britain answered this question very differently to the panelists from the other three countries. British panelists overwhelmingly predicted a negative consequence for the doctorate which is the opposite of what the panelists from Australia, Canada, and the United States predicted for the Ph.D. degree. From these results, teacher training for doctoral candidates may not be viewed the same way in Great Britain as it is in North America. This suggests possible differences about national perceptions of Ph.D. degree programs.

QUESTION 18. "Approving group or team research [i.e., thesis research conducted by more than one student]." Seven [11 percent] of the panelists indicated this action would have no effect on the degree. The remainder were almost equally split in their prognoses. Those who predicted a negative outcome [43 percent] were outweighed slightly by those who predicted a positive resultant effect [46 percent]. The combined panel response to question 18 can be considered ambiguous as are the responses to questions 9 and 13. Table 5 shows that the difference between the negative and positive responses is only 3 percent. In Table 6 this ambiguity is also revealed, although not to the same extent, in the responses from Great Britain and the United

States. Canada, however, exhibits the greatest negative-positive range of 47 percent, but what may be more relevant is that the majority of the panelists from Canada predicted a negative outcome which is counter to the prognoses from the other three countries. An ambiguous response such as this to question 18 needs further investigation, and a study of group research practices as now exist in the United States may well be a good place to start the investigation. [Note 50 percent of the panelists from the United States predicted a positive outcome for the Ph.D. degree if group or team research is approved.]

With respect to all of the 18 questions posed, and particularly questions 1,2,6,8,10, and 14, the research validity is an issue. All of the panelists have different experiences with the Ph.D. degree, and thus they bring different perspectives and values to the process of answering each of the 18 questions.

These final prognoses of the panel can be grouped in line with the three fundamental components of the Ph.D. degree, as have been described in Chapter II and set out in Table 4. With respect to the lengthy study component, seven questions are relevant, and they are questions 4,6,10,11,14,16, and 17. Looking at the original research component there are nine related questions, specifically questions 1,2,3,4,11,12, 14,15, and 18. For the thesis preparation component the eight relevant questions are 4,5,7,8,9,11,13, and 14. By reviewing the answers to these groups of questions, it is possible to gain an insight into the panel's prognosis related to each of the funamental components. All of the individual prognoses appear in Appendix Q, and a synopsis for each of the fundamental component, with associated Tables 7, 8, and 9, follows.

LENGTHY STUDY COMPONENT. Of the seven questions relevant to the lengthy study component of the degree, as set out in the Ph.D. degree acquisition model, six [4,6,10,11,16,17] produced a positive response from the panel, and the seventh [14] produced a negative response.

Table 7: Final prognoses for lengthy study component action

QU	LENGTHY STUDY RELATED ACTION	PROGNOSIS -VE*	 NE	 +VE
4.	Improving the advising, directing, or supervising of doctoral students.	0**	0	100
6.	Defining the reason for, the extent of, and the method of mandatory/required study/courses.	5	27	68
10.	Increasing the emphasis placed on the study of research methods.	3	17	79
11.	Permitting and facilitating the attainment of all components of the degree by part-time students.	25	13	62
14.	Decreasing the time allowed to complete all components of the degree.	44	29	27
16.	Approving interdisciplinary study.	3	14	83
17.	Incorporating teacher training into the degree [i.e., teaching doctoral students how to teach].	19	21	60

* -VE means negative, NE means no effect, +VE means positive
** Frequency of response percentage as listed in Table 5

From this it is deduced that lengthy study component related actions [based on the problematic issues defined by the panel and triangulated with the prescriptive literature] specified in questions 4,6,10,11,16, and 17 will most likely have a positive effect on the resultant Ph.D. degree. Whereas action [based on the problematic issue defined by the panel and triangulated with the prescriptive literature] specified in question 14 will most likely have a negative effect.

ORIGINAL RESEARCH COMPONENT. Turning to the nine questions which are related to the original research component, as set out in the Ph.D. degree acquisition model, six questions [1,2,4,11,12,15] were answered positively, one [18] drew responses which were similar in distribution, that is with almost equal positive and negative responses, and two questions [3,14] produced negative answers from the panel of participants.

Table 8: Final prognoses for original research component action

QU	ORIGINAL RESEARCH RELATED ACTION	PROGNOSIS		
		-VE*	NE	+VE
1.	Insisting the priority of doctoral research is to add to knowledge [i.e., original contribution].	19**	6	75
2.	Insisting the priority of doctoral research is to enhance learning [i.e., research training].	27	10	63
3.	Insisting that doctoral research be "basic" or "pure" not "applied or "practical."	81	2	17
4.	Improving the advising, directing, or supervising of doctoral students.	0	0	100
11.	Permitting and facilitating the attainment of all components of the degree by part-time students.	25	13	62
12.	Ensuring all doctoral students receive a stipend and/or funds to conduct their research.	3	13	84
14.	Decreasing the time allowed to complete all components of the degree.	44	29	27
15.	Accepting "creative" approaches to research [i.e., novel in lieu of traditional approaches].	31	15	55
18.	Approving group or team research [i.e., thesis research conducted by more than one student].	43	11	46

* -VE means negative, NE means no effect, +VE means positive
** Frequency of response percentage as listed in Table 5

This means, that original research component related actions [based on the problematic issues defined by the panel and triangulated with the prescriptive literature] specified in questions 1,2,4,11,12, and 15, will most likely have a positive impact on the resultant Ph.D. degree. Whereas, action [based on the problematic issues defined by the panel and triangulated with the prescriptive literature] specified in question 18, will most likely result in sizable positive or negative outcomes. Actions, however, [based on the problematic issues defined by the panel and triangulated with the prescriptive literature] defined in questions 3 and 14, will most likely cause negative results.

THESIS PREPARATION COMPONENT. Looking at the eight questions [4,5,7,8,9,11,13,14] relevant to the thesis preparation component, as set out in the Ph.D. degree acquisition model, four [4,5,7,11] stimulated positive prognoses, two [8,14] produced a negative response, and two [9,13] produced responses which were closely balanced.

Table 9: Final prognoses for thesis preparation component action

QU	THESIS PREPARATION RELATED ACTION	PROGNOSIS -VE*	 NE	 +VE
4.	Improving the advising, directing, or supervising of doctoral students.	0**	0	100
5.	Requiring doctoral students acquire writing skills before they write their theses.	6	5	89
7.	Clarifying the standards for preparing and evaluating the doctoral thesis.	2	6	92
8.	Decreasing the time allowed to write the thesis.	46	26	28
9.	Approving alternatives to the traditional thesis [e.g., a book or journal articles].	46	13	41
11.	Permitting and facilitating the attainment of all components of the degree by part-time students.	25	13	62
13.	Requiring the written thesis be shorter than the existing norm [i.e., fewer pages].	30	32	38
14.	Decreasing the time allowed to complete all components of the degree.	44	29	27

* -VE means negative, NE means no effect, +VE means positive
** Frequency of response percentage as listed in Table 5

Therefore, thesis preparation component related actions [based on the problematic issues defined by the panel and triangulated with the prescriptive literature] specified in questions 4,5,7, and 11, will most likely have a positive effect on the Ph.D. degree. For actions [based on the problematic issues defined by the panel and triangulated with the prescriptive literature] specified in questions 8 and 14 the impact will most likely be negative, and for those actions specified in questions 9 and 13 the impact on the resultant doctorate will most likely be positive or negative.

Summary

Working from the historical and regulatory literature related to the Ph.D. degree, the data contained therein was assessed and categorized. The literature revealed the degree had, and has, three fundamental components which must be fulfilled before the degree can be awarded. By assembling these components a Ph.D. acquisition model was formulated in accordance with the theoretical literature related to models. It was then hypothesized, based on the Ph.D. acquisition model, that any change to the fundamental components of the doctor of philosophy degree may cause a change in the resultant doctorate. Using this hypothesis as the starting point, the driving research question was posed. The question being, "[w]hat effect, either positive or negative, do experts think altering the fundamental components [lengthy study, original research, thesis preparation] of the degree Philosophiae Doctor, will most likely have on the resultant degree?"

Using the Delphi technique a panel defined the problematic issues related to the degree; these issues were then triangulated [validated] with issues defined in the prescriptive literature published between 1960 and 1988. A questionnaire detailing 18 hypothetical actions related to the fundamental components was then directed reiteratively to the panel of participants. At the conclusion of Round 3 the majority of the panel's prognoses were acceptably stable.

Through an analysis of these prognoses in relation to the model, the research question was addressed. Turning to the lengthy study component of the degree, the panel's prognoses, which are related to questions 4,6,10,11,12,14,16, and 17, highlight the following important points. First, the actions as described in the questions are relevant to the Ph.D. degree; second, the actions will affect the degree; and third, the effects on the degree will either be positive or negative. The matter of whether the action would produce a strong or weak effect is not here of concern. The model does not indicate the strength of this relationship, nor does it permit this type of relationship to be predicted.

What the model indicates, and what the panel's prognoses bear out, is that any change to the components [as revealed through the panel's answers to the 18 questions] will result in a change, either positive or negative, in the doctorate. Similar remarks can be made with respect to the original research and the thesis preparation components and the panel's prognoses, which are related to questions 1,2,3,4,11,12,14,15, and 18, and questions 4,5,7,8,9,11,13, and 14, respectively.

As a final statement, the research question is answered as follows. If any alteration is made to the fundamental components of the Ph.D. degree, there will most likely be an impact on the degree; and, if these actions [e.g., actions as described in the 18 questions used in this study] are related to the lengthy study component, the original research component, and the thesis preparation component, there can be a positive and/or negative effect on the resultant doctorate. Secondarily, the prognostic wisdom of the panel of participants facilitates the assessment of prescriptive literature related to the degree. Optimistic projections, stemming from proposed changes to the components of the degree, can now be assessed against a source of data having a conceptual base. Several of these changes are discussed in the following chapter.

VI

CONCLUSION

Summary of Research

A number of aspects of the Ph.D. degree are causing concern [pp.1-10]. These concerns stimulated the undertaking of an international study that focused specifically on the fundamental components of the degree and its associated acquisition process.

The degree Philosophiae Doctor first appeared at the universitas in Paris circa 1250, and slowly it spread throughout Europe [pp.18-23]. Its research focus, as developed at the university in Berlin by Humboldt, has been adopted in the United States, Canada, Great Britain, then Australia [pp.23-41]. Acquiring the degree has always necessitated the completion of three fundamental components. **Lengthy Study** is the time doctoral students spend doing all those things, whether they be directed [e.g., attending courses] or non-directed [e.g., reading, thinking] which assist with the acquisition of the degree; **Original Research** is that research not previously undertaken, carried out in accordance with university regulations, with the approval of a department or faculty, and under the observation of an individual deemed qualified to supervise doctoral research; and **Thesis Preparation** - the manuscript in which the original research is documented [in some countries the term dissertaion is used]. For details on these components the reader is referred to Chapter II [pp.22,23,41,42,45,46].

A number of Ph.D. degree related works have been published between 1960 and 1988 [pp.42,43,App.C], and recommendations to improve the doctorate have been prescribed [pp.43,44]. As these recommendations are optimistic projections, there is no guarantee they will enhance the resultant degree. Therefore, a more substantive study of the doctorate, one based on a conceptual framework, was considered necessary. The research question posed [p.47] was concerned with the most likely effect of manipulating the three fundamental components of the degree on the resultant degree. To answer the question within a conceptual framework, a model of the degree, the Ph.D. acquisition model, was constructed [pp.49-56] because there is an absence of theory in higher education [p.48]. Commenting on this lack of theory, Malaney (1988) writing in a text on theory and research in higher education, states:

> In any area of study, research is of major importance, and graduate education is no exception. While research related to graduate education in the United States has existed almost since inception of graduate study in this country in the 1800s, there has been no common effort or direction, and no theories to drive any effort. The bulk of the research related to graduate education is relatively recent...(p.397).

As a prognostic study [pp.59-64], the research incorporated a compatible methodology, the Delphi technique [pp.66-72], and involved a panel of participants experienced with the degree [pp.73-75,App.I].

By applying this methodology, the panel identified the problematic issues related to each of the fundamental components of the degree [pp.84-90]. These issues compared favorably with the prescriptive recommendations to improve the degree. Based on this validation, 18 questions were derived [pp.76-78] which were then directed reiteratively to the panel, and using a stability measurement computation [pp.68,69,81,App.F] the majority of the Round 3 responses were stable [pp.91-93]. From this, the panel's prognoses related to the manipulation of the three fundamental components of the degree were assessed [pp.106-108], which answered the research question.

It appears that there are a number of actions related to the fundamental components which could be taken, and which the panel predicted would impact upon the resultant degree. The implications of these actions, for the traditional and non-traditional Ph.D. degrees are discussed in the following section.

Implications for Ph.D. Degree

Based on the prognoses of the panel, the impact on the traditional Ph.D. degree [including those offered in unconventional formats - pp.8,9], and non-traditional Ph.D. degrees can be assessed from the results of the actions detailed in the questions related to the three fundamental components of the degree.

TRADITIONAL. Nowhere is the lengthy study component defined precisely within the literature. Although in Great Britain the overall time that doctoral work will be officially funded has been reduced, and as the regulatory literature shows, universities have maximum permissible time periods in which the degree must be completed, lengthy study is acknowledged but evades precise definition [p.45]. Regardless, it is, and has always been, a fundamental component of the doctorate. From the panel's prognoses, some forms of action related to the lengthy study component could have a distinct positive effect on the traditional Ph.D. degree. These actions are as follows: improving the advising, directing, or supervising of students; defining the reason for, the extent of, and the method of mandatory/required study/courses; increasing the emphasis placed on the study of research methods; permitting and facilitating the attainment of all components of the degree by part-time students; approving interdisciplinary study; and, incorporating teacher training into the program. Turning to the negative projections, only one action was seen as possibly having a detrimental effect on the resultant doctorate. This action is decreasing the time allowed to complete all components of the degree.

Original research is interpreted as research that has not been undertaken before [pp.45,46]. It has always been a fundamental component of the Ph.D. degree, and it is normally undertaken after the lengthy study component has been substantially completed. With respect to original research there is one ambiguous action, that is action which would most likely cause either sizable positive or sizable negative effects on the doctorate. For this action, approving group or team research, there was no meaningful difference between the number of respondents who indicated a negative prognosis and those who indicated a positive prognosis for the resultant Ph.D. degree. This split in the response indicates there is a strong difference of opinion within the panel, and further research focusing specifically on this issue needs to be considered before any action is implemented. Two actions were seen by panelists as most likely having a negative effect on the degree. These actions were as follows: insisting that doctoral research be "basic" or "pure," not "applied" or "practical"; and, decreasing the time allowed to complete all components of the Ph.D. degree.

All of the remaining actions related to the fundamental component original research were viewed positively. These actions include: insistence that the priority of doctoral research is to add to knowledge [i.e., original contribution]; insisting the priority of doctoral research is to enhance learning [research training]; improving the advising, directing, or supervising of doctoral students; permitting and facilitating the attainment of all components of the degree by part-time students; ensuring all doctoral students receive a stipend and or funds to conduct their research; accepting "creative" approaches to research [i.e., novel in lieu of traditional approaches]; and, approving interdisciplinary study.

The thesis preparation component refers to the document written by a Ph.D. degree candidate [p.46]. It details the candidate's original research, which is predicated upon the lengthy study component.

Two thesis preparation component related actions were perceived to have a greater likelihood of causing a negative impact on the Ph.D. degree: decreasing the time allowed to write the thesis; and decreasing the time allowed to complete all components of the degree. Positive predictions by the panel were associated with four actions. Specifically, improving the advising, directing, or supervising of doctoral students; requiring doctoral students to acquire writing skills before they write their theses; clarifying the standards for preparing and evaluating the doctoral thesis; and permitting and facilitating the part-time attainment of all components of the degree. Two actions which would produce either positive or negative effects are, approving alternatives to the traditional thesis [e.g., a book or journal articles], and requiring the written thesis be shorter than the existing norm. Note the former produced a pronounced divergence in the response, and the latter produced an equally large "no effect" response.

Thus, corrective actions or innovations aimed at enhancing the traditional Ph.D. degree can be directed at the three fundamental components of the degree. Based on the findings of this research, the results of implementing these innovations should be positive if the positive prognostic projections of the panel are noted, and the existing educational history, culture, and infrastructure are taken into consideration. But, it needs to be noted that the implementation of any action related to a component may not produce immediate results. For example, "requiring doctoral students acquire writing skills before they write their theses," could stimulate an ongoing series of writing seminars that would not necessarily produce immediate improvement. The process becomes more complex when an action flows across all three of the components. For example, "improving the advising, directing, or supervising of doctoral students" could necessitate an entirely new approach to the issue. Such an approach may take considerably more time and, certainly, more coordination and cooperation if it is going to be applied across all of the components to improve the resultant degree.

Perhaps the most demanding situation, would be one where several innovations to improve the degree are implemented simultaneously. Looking at a scenario where only two actions are initiated it becomes apparent that some actions, when combined, could be counterproductive and may cause a negative impact on the resultant Ph.D. degree. For example, approving group or team research might, because of newly created problems related to communication and commuting, increase the time taken by candidates to complete their original research. This, in conjunction with decreasing the time allowed to complete all components, may result in a doctorate not being completed within an officially desired completion time. Similar types of problems would also occur with non-traditional doctor of philosophy degrees which are discussed in more detail below.

NON-TRADITIONAL. As revealed in chapter one, the Ph.D. degree has evolved over centuries. Several changes in the requirements [e.g., the language requirement - p.27], not the components, for the degree have occurred. It could be argued that the majority of the changes that have occurred since the degree's inception have been evolutionary changes. More dramatic changes to the degree, changes that could be referred to as revolutionary changes, are not recorded in the literature prior to more contemporary times.

What has now developed is the perception, in the minds of some scholars, that the traditional Ph.D. degree [including those offered in unconventional formats - pp.8,9] no longer fulfills the academic and professional needs of all students, and that major changes to the degree are necessary. This perception of a problem and needed action has resulted in deliberation by the scholars, and subsequently several non-traditional Ph.D. degree programs have been suggested in the higher education literature published in Australia, Canada, Great Britain, and the United States. Here non-traditional is defined as a program that "...encourages diversity of individual opportunity rather than uniform prescription..." (Commission on Non-Traditional Study, 1975, p.xi). The merits of these proposed programs, and what has prompted them is not the focus of this section of the chapter. Rather, what will be the focus of our attention is how the problematic issues identified and assessed by the panel would relate to four non-traditional Ph.D. degree programs: 1. Group Research, 2. Three-Track, 3. Time-Limited, 4. Two-Track.

1. **Group Research**: Stranks (1984), who has studied the Ph.D. degree in Australia, has considered several of the constraints on the degree as it exists in that country. In addition to the problems of financial restrictions for students and a bleak future for academic employment, Stranks discusses the process of socialization. This latter constraint is exacerbated by the fact that the majority of the professors who supervise doctor of philosophy students have limited research experience outside of the university, which does not enable them to stimulate the student into acquiring a rich array of research interests – "...if we are to enhance the personal qualities of our post-graduates we should take steps to develop greater diversity of interest within the post-graduate in all fields of scholarly activity" (Stranks, 1984, p.174). He suggests this undesirable situation may be overcome through the introduction of group research for doctoral students [in all disciplines it is assumed]. It is claimed that this non-traditional approach to the Ph.D. degree would result in the following outcome:

> Our present Ph.D. programmes, however, tend to encourage a convergence of interests in the post-graduate student. The Ph.D., when undertaken within a research group, as distinct from the traditional isolated experience, has the important merit of providing intellectual competitors. This would create benefit derived from peer group activity as distinct from the research supervisor's activity, and group work is also important in reducing the post-graduate's sense of isolation. Further, expanded group activity helps individual candidates understand the much broader aspects of their discipline (p.174).

In Great Britain, this has been supported. Under the heading of an alternative Ph.D., Renouf (1989, p.87) writes "...that at the root of poor completion rates and general dissatisfaction with Ph.D. research lie two problems: intellectual isolation, and an unrealistic and poorly defined method of assessment – the thesis." Centering his comments around the social sciences doctorate, he states that for the Ph.D. degree a new approach is necessary. To Renouf, the solution is research undertaken by a group of researchers, not just one researcher working alone. He believes group research can be justified by three reasons:

> First, a Ph.D. is currently an unrealistic piece of work because it requires a researcher to work alone on a topic which quickly achieves an overwhelming scale. Feelings of helplessness, inadequacy, an inability to cope, intellectual stagnation and confusion are common. These should not be considered as in some way inevitable or integral parts of the learning process. They are deeply counterproductive. A group Ph.D. preserves the best parts of the "traditional" Ph.D. whilst overcoming the problem of isolation. Group project research allows for mutual development. It generates feedback and discussion. It provides a support network. It gives opportunities to work through theoretical problems, and it creates a realistic, collective working environment of the type found in all walks of life. Secondly, writing a thesis appears more and more to be a test of stamina - a hellish rite of passage into the academic world. Difficulties are compounded by the implicit denial in a thesis of the developmental nature of Ph.D. research, and the increasingly provisional nature of any conclusions reached, given the size of almost any research topic. Combining a series of reports with group project research creates a strong motivational framework. Reports validate the process of learning, as well as the end product of that process. And they recognize the provisional nature of research conclusions. Finally, there could be other advantages to group project work. If a project was considered worthy of further research, extra researchers could be added in. As some finished, others could take their place. Inter-disciplinary research could be enhanced, with genuine debates and interaction between people with different disciplinary backgrounds required by the group structure (p.91).

What Renouf and Stranks claim is that the approach to learning how to undertake research, in the traditional Ph.D. degree program, is not effective. Both believe a non-traditional approach would enhance the research learning process; both see group research as the appropriate innovation.

Group research was addressed directly through question 18: "approving group or team research [i.e., thesis research conducted by more than one student]." There were four members of the panel who indicated, in Round 1 of the study, that group research was a problematic issue with respect to the Ph.D. degree. They said, depending on their point of view, that group research could be a problem because of its presence or its absence. As discussed in the problematic issues section of chapter four, one respondent said that there is "bias to large lab group research in many fields," and another respondent said there is "too much stress on individual research, too little provision for team research especially in the humanities and social sciences."

The total response from the panel to this question revealed an almost balanced difference of opinion. Those who believed the outcome of approving group or team research would be negative were numerically counterbalanced by those who thought the outcome on the resultant doctorate would be positive. [This difference in opinion may reflect the "science" and "non-science" composition of the panel, or the personal perspective of panel members.]

Although all the panelists who raised the issue of group research were from the United States, Stranks is from Australia and Renouf is from Britain. As a problem the issue is certainly not restricted to one country. A compromise position would be one way of satisfying those of the more traditional persuasion, and those of a non-traditional leaning. If group or team research was offered as a research component option, doctoral students may have an alternative more compatible with their needs. This issue will be discussed further in the next section.

2. **Three-Track**: In a Canadian report prepared for a committee of university presidents by a research and planning group, the future of post-secondary education in Ontario was documented. The authors claimed that with respect to higher education, "...the future development of graduate studies is the adaptability of graduate instruction to different fields of activity rather than one specific field" (Porter et al., 1971, p.99). Their report posed the question, are Canadian graduate schools producing the right product? This question was founded, in part, on Porter's (1970) earlier suggestion that the problem of Canadian graduates is their over-specialization. For Porter et al. (1971, p.101), the realization they ultimately arrived at was that the Ph.D. degree may be out of date. As a way of overcoming this situation, Porter and his associates turned to the three-track degree proposal of Earle D. Nestmann [graduate student, York University, Canada] and Dr. L.H. Cragg [university president, Mount Allison University, Canada]. This proposal has been succinctly summarized by Law (1970) as follows:

> 1. Train some Ph.D.s for undergraduate teaching [one quarter of the present Ph.D.s in chemistry, they estimate, would go into this type of program]; this section would not be heavily research oriented. 2. Train a second group in in-depth research; both research and course work would be broader than the present Ph.D. programs. 3. Train the third group of Ph.D. candidates around a core of courses with less specialization and more flexibility; out of this type of program would come leadership to overcome special technological problems such as pollution, planning for innovation, and industrial management including sales and market analysis (p.31).

The three non-traditional options, defined by Nestmann and Cragg and which are recommended for the science disciplines, are seen by Porter et al. as viable and desirable non-traditional alternatives to the traditional Ph.D. degree program.

Fundamentally, what is suggested in the report of Porter et al. (1971) is a Ph.D. degree which has three tracks or options: teaching, basic or pure research, applied or practical research. Insight into these three concepts can be achieved through an examination of two questions which were posed to the international panel of participants.

For the question related to teaching, the majority response of the panel was positive. Sixty percent predicted that a favourable outcome would most likely occur as a result of "incorporating teacher training into the degree [i.e., teaching doctoral students how to teach]." Whereas 19 percent held a negative outlook. The second and third concepts are related to the research question, "insisting that doctoral research be 'basic' or 'pure,' not 'applied' or 'practical'." For this question a pronounced negative outcome would, according to the panel, most likely occur. Eighty-one percent of the panelists foresee that insisting the research be basic/pure would result in a deleterious effect on the Ph.D. degree. However, some panelists supported the opposite view, which indicates there are supporters for all of the three tracks proposed.

Although the panel responded either positively or negatively to two questions related to the three tracks described by Porter et al. (1971), it must not be construed as approval of a three-track Ph.D. degree. All of the three concepts discussed here could be incorporated into a traditional Ph.D. degree without the need to create three distinct degree tracks. For the latter process to take place, far more indepth consideration needs to be given to the implications of such a revolutionary innovation being implemented.

3. **Time-Limited**: In Great Britain, the scholars Young, Fogarty, and McRae (1987, p.61) state that an influential number of academics believe "...it may not be possible to write a satisfactory doctoral dissertation in four years." These authors acknowledge that for some in higher education, notably administrators and policy makers, completing a Ph.D. degree in under four years is an attainable and in fact desirable goal [for full-time students it is assumed]. What these scholars see is a bifurcation of views between those who see the doctorate as necessitating emphasis on a contribution to knowledge, and those who see the doctorate as being a research training process. Given this, Young, Fogarty, and McRae suggest that the onus of proof lies with those who support the four-year limit. The task being one of demonstrating parity of esteem or equality between the traditional doctorate, which may have required more than four years to complete, and the non-traditional doctorate, which would be completed in less than four years. For these authors parity of esteem may be achieved through time-limited study:

> One way forward might be to tackle the problem of parity of esteem together with the problem of over-long completion times. The solution to these linked problems may be found in time-limited study...a second route to the doctorate could be offered, based on the taught programme followed by a period of research culminating in a lesser thesis which, while it would represent a contribution, would be less substantial a contribution to knowledge than is customarily expected. A high completion rate would be secured by the requirement that the thesis be submitted no later than nine [or twelve] terms from registration. Parity of esteem would follow from the accomplishment of a respectable piece of work within a prescribed period of time...Thus there might exist two alternative modes of doctoral study - "Mode A" and "Mode B"...The second mode we see as time-limited and partly taught, and we see no reason why very high submission rates should not be obtained there. Successful completion in that mode could be reckoned to enjoy parity of esteem by virtue of its adherence to a fixed completion date (pp.61,62).

This proposal by Young, Fogarty, and McRae is certainly a revolutionary approach to the alleged problem of long completion times. Authors from several countries have studied this issue, and the most common question raised concerns itself with restructuring of the traditional Ph.D. degree program to facilitate completion within four years or less (Carnegie Commission on Higher Education, 1971, p.31; Kerr, 1971, p.28; Rudd, 1985, p.134; Spurr, 1970, p.138). Several of these authors believe this is a desirable goal. What Young, Fogarty, and McRae are suggesting, however, is a non-traditional mode to attain the doctor of philosophy degree, an alternate mode which necessitates completion of the degree in a maximum of four years. It should be noted that completion time is a controversial and topical issue for those who are concerned with the Ph.D. degree, and as highlighted in the preface, funding penalities are now being imposed in Great Britain when candidates take longer than four years to complete their Ph.D. degrees.

As described, the underlying rationale for this proposed time-limit innovation is a difference in opinion in what constitutes the legitimate focus for a Ph.D. degree: should the focus of the degree be a contribution to knowledge, or should the focus be on the training of researchers? Here the responses from members of the panel of participants might shed some light on the matter. On both accounts, that is contributing to knowledge and training researchers, the majority of the panel answered in the affirmative. More specifically, to the questions, "insisting the priority of doctoral research is to add to knowledge [i.e., original contribution]," and "insisting the priority of doctoral research is to enhance learning [i.e., research training]," the panel predicted a positive outcome would most likely occur with the Ph.D. degree. For the first question the response was 75 percent, and for the second question 63 percent. This is interpreted to mean that as foci for the Ph.D. degree both are valued and desired. In addition, these responses by the panel underscore the rationale described by Young, Fogarty, and McRae.

Turning to their proposed innovation, the time-limited Ph.D. degree, three questions asked of the panel help clarify the issue of the time variable. These questions were prepared in response to the problematic issues raised by the panel. With respect to the issue of long completion times taken for the thesis, one panelist said that, "an inordinate amount of time is spent writing the thesis." On the issue of too lengthy theses the comment "does a prescribed length only encourage irrelevance and bloated organization" was received. Concerning the time taken to complete the entire degree, one respondent thought a problem existed with the "length of time taken to complete the requirements." The result of this and similar problematic issues identified by the panel were the questions, "decreasing the time allowed to write the thesis," "requiring the written thesis be shorter than the existing norm [i.e., fewer pages]," and "decreasing the time allowed to complete all components of the degree." For the first and third questions, the panel's responses were negative, for the second question positive.

To summarize, the panel is in favour of reducing the size of the thesis, but not in favour of limiting the time to complete the written thesis or the Ph.D. degree. A time-limited degree may not result in an improved degree.

4. **Two-Track**: Following several earlier researchers (Andersen, 1983; Crossan and Nelson, 1986; Dill and Morrison, 1985), who compared the requirements for the doctor of philosophy and the doctor of education degrees, another author has described a new way of looking at these two doctorates. What he proposes is a two-track doctor of philosophy degree. Courtenay (1988, p.18) states that his proposal is related specifically to the discipline of education, and he sees the need for it "[a]s a means of dealing with the distinctions issue and thereby reducing the confusion over the two degrees...," that is the doctor of philosophy and the doctor of education degrees.

> The suggestion is made here that the various fields of education use the Ph.D. only, but with two tracks, one for scholars of practice and one for scholarly practitioners. Several reasons appear to support that conclusion. In the first place, the Ph.D. degree is well-known and understood by colleagues in the traditional disciplines, generally, and more specifically, by members of Graduate School program review committees. Some education faculty in all fields would criticize this reason as capitulation to external influential forces. Such criticism may be countered with two arguments. First, if it doesn't really matter what you call the degree, then why not choose the Ph.D.? Secondly, if education faculty can communicate clearer to colleagues about the field of education by choosing the Ph.D. label, then why not?...This solution is a "viable" means because it promotes the end without restraining the flexibility that exists in doctoral education programs now. By having two Ph.D. tracks, one for researchers/professors and one for administrators/teachers, the preference of the student and the two basic career objectives are met. Finally, this solution appears to be appropriate because it provides long-range benefits. Adopting a single degree with two tracks causes faculty to reflect more carefully about the content of departmental programs and the relevance of that content to the goals of the students...The Ph.D. degree with two tracks would appear to be the viable solution for graduate programs in education. It communicates to other disciplines; it is flexible; and most importantly, it meets the needs of students (pp.18,19).

Twenty years earlier, Nichols (1967) had also proposed a two-track Ph.D. degree program. Founded on a research/teaching dichotomy, or as

Nichols labelled it an honors/pass differentiation, he claims there is a need to acknowledge the two purposes of the degree. By acknowledging these purposes Nichols felt it was possible to create two degrees, each of which would equip graduates to undertake their primary function in professional life - either to conduct research or to teach at university. The honors Ph.D. degree would include periods of independent study, seminar courses, research training, and a piece of original research work all undertaken in four years. The pass Ph.D. would place emphasis on interpretation and synthesis, would include a supervised teaching experience, seminars on writing with the intent of having journal articles published, all of which would be achieved within a maximum of four years. Nichols (1967, p.333) claims innovation is called for because the existing Ph.D. degree program "...hampers the creative [honors] and it can discourage the diligent [pass]."

An honors designation has recently been suggested as a worthwhile appellation for Ph.D. degrees in Great Britain. Ash et al. (1988) believe that doctor of philosophy degrees in that country should be awarded with distinction to those whose work is of particular merit. Although Nichols [and Courtenay] suggests two degrees based on different program orientations, and Ash and his associates suggest two degrees based on merit, they have a common point. They see a need to separate either the candidates or the graduates into two identifiable categories. Although one recommendation refers to a program and the other to an acknowledgement of a graduate's superiority, the two-track concept can be identified. Clearly, this is a non-traditional approach to a degree, for which historically there has only been one method of attainment.

Both of Nichols' honors and pass doctorates have three concerns which need to be considered. One of these concerns, that of completion time [within four years] is common, and the reader is directed to the time-limited non-traditional Ph.D. degree where this issue was discussed. It will suffice to say here, the panel did not place time limitations in high stead.

For the honors doctorate, research training is the second concern. The question "insisting the priority of doctoral research is to enhance learning [i.e., research training]" produced a majority positive response. The third concern is original research. To the question what effect will "insisting the priority of doctoral research is to add to knowledge [i.e., original contribution]" most likely have on the Ph.D. degree, the majority of the panel answered positively.

For the second concern of the pass doctorate a supervised teaching experience is thought appropriate. Turning to the panel's response to the teaching issue, "incorporating teacher training into the degree [i.e., teaching doctoral students how to teach]," the majority believed the outcome would be positive. Writing seminars was the third concern, and although this matter was not raised specifically with the panel, a related question was. Asking the panel if "requiring doctoral students acquire writing skills before they write their theses," produced a highly positive response.

As a non-traditional program the two-track Ph.D. degree encourages diversity of individual opportunity, unlike the restrictive traditional degree program. Although a number of purposes have been suggested for the two tracks, the principle of difference between tracks is constant.

Implications for University Administrators

As revealed in the previous chapter, the Ph.D. degree will, according to the panel, be affected either positively or negatively in the event of specific actions being taken. These actions would necessitate administrative and educational changes in the procedures traditionally required for the attainment of the degree. In higher education such actions are commonly described as innovations (Seymour, 1988). Good (1973, p.302) says innovation is "...the introduction of a new idea, method, or device in curriculum, educational administration, etcetera," and Dejnozka (1983, p.86) qualifies innovation as, "...a novel change that is adopted and supported because it is considered to be a practical advance in accomplishing the goals of a system."

This section details the implications of innovations within the university; more specifically, the implications for administrators associated with innovations implemented to resolve Ph.D. degree related problems. Here, administrators are defined as staff whose primary professional function is institutional governance. The term includes those whose position is full-time and salaried, e.g., Department Head, President, Registrar, Vice-Chancellor, etc., as well as those whose position is part-time and paid by honoraria, e.g., Member of Board of Govenors, Member of Senate, Regent, etc. [n.b., most academic staff perform administrative functions, and no change in a policy or procedure can be demanded by administrators (Association of American Universities, 1990, p.4; Nordvall, 1982, p.42; Seymour, 1987, p.37)].

Higher education is an all-encompassing term used to describe the parts, the procedures, and the products of post-secondary education.

With respect to implementing an innovation to improve the Ph.D. degree, administrators need to address the fundamental component related procedures by which the degree is attained. From the results of this research, it is apparent that several actions will influence the procedures associated with the fundamental components and will most likely not improve the resultant doctorate. These actions, which have been grouped using the criterion of less than 30 percent of the panel predicted positive effects on the degree, are listed in Table 10. By using 30 percent of the response as the cut-off figure the most likely outcome of the actions in Table 10 would be negative. Administrators could have some success improving existing Ph.D. degree programs, if they avoid incorporating the three actions listed in Table 10 in their plans. Interestingly, the actions are not concentrated around any one fundamental component.

Table 10: Actions the panel believes will most likely have a negative effect on Ph.D. degree

COMPONENT*			PROGNOSIS		
	QU	ACTION	-VE**	NE	+VE
R	3.	Insisting that doctoral research be "basic" or "pure" not "applied or "practical."	81#	2	17
T	8.	Decreasing the time allowed to write the thesis.	46	26	28
SRT	14.	Decreasing the time allowed to complete all components of the degree.	44	29	27

* S Issue related to lengthy study component of Ph.D. degree
R Issue related to original research component of Ph.D. degree
T Issue related to thesis preparation component of Ph.D. degree
** -VE means negative, NE means no effect, +VE means positive
# Frequency of response percentage as listed in Table 5

From the table it can be seen that the actions are restrictive, and administrators might do well to investigate some compensatory mechanism if one of these action must be initiated. For example, an innovation to improve the degree that decreases the time allowed to write the thesis will have more chance of being successful, if the requirements associated with the thesis have been reduced or restructured to allow for the loss in available time [e.g., approving shorter more selective literature reviews]. Without this compensation the innovation may have a negative impact on the resultant degree.

Actions, as posed to the panel, which will most likely improve the resultant Ph.D. degree are greater in number. These actions, which have been grouped using less than 30 percent of the panel predicted negative effects on the degree, are listed in Table 11. Initiating innovations based on these actions should allow administrators to improve the Ph.D. degree with a low risk of failure. Provided, of course, that all ramifications which will inevitably occur as a result of the innovation have been predicted and planned for.

Of particular note among these 12 actions is the action incorporated into question four – improving the advising, directing, or supervising of doctoral students. This question was the only one to produce a unanimous response for one outcome only. All of the panelists [98.5 percent] who answered this question indicated that the outcome for the Ph.D. degree would be positive. Although not as pronounced, the response to question five – requiring doctoral students acquire writing skills before they write their theses, and the response to question seven – clarifying the standards for preparing and evaluating the doctoral thesis, were similar and very favorable for the resultant Ph.D. degree. For both questions the positive responses were 89 and 92

Table 11: Actions the panel believes will most likely have a positive effect on Ph.D. degree

COMPONENT*	QU	ACTION	PROGNOSIS -VE**	NE	+VE
R	1.	Insisting the priority of doctoral research is to add to knowledge [i.e., original contribution].	19#	6	75
R	2.	Insisting the priority of doctoral research is to enhance learning [i.e., research training].	27	10	63
SRT	4.	Improving the advising, directing, or supervising of doctoral students.	0	0	100
T	5.	Requiring doctoral students acquire writing skills before they write their theses.	6	5	89
S	6.	Defining the reason for, the extent of, and the method of mandatory/required study/courses.	5	27	68
T	7.	Clarifying the standards for preparing and evaluating the doctoral thesis.	2	6	92
S	10.	Increasing the emphasis placed on the study of research methods.	3	17	79
SRT	11.	Permitting and facilitating the attainment of all components of the degree by part-time students.	25	13	62
R	12.	Ensuring all doctoral students receive a stipend and/or funds to conduct their research.	3	13	84
R	15.	Accepting "creative" approaches to research [i.e., novel in lieu of traditional approaches].	31	15	55
S	16.	Approving interdisciplinary study.	3	14	83
S	17.	Incorporating teacher training into the degree [i.e., teaching doctoral students how to teach].	19	21	60

* S Issue related to lengthy study component of Ph.D. degree
R Issue related to original research component of Ph.D. degree
T Issue related to thesis preparation component of Ph.D. degree
** -VE means negative, NE means no effect, +VE means positive
# Frequency of response percentage as listed in Table 5

percent respectively. One wonders what would be the outcome on the Ph.D. degree if these two actions implemented. The associated costs would be minimal, and none of the components of the degree would be manipulated so extensively that firm beliefs and practises would be severely compromised. Theses, written with well honed writing skills, guided by well defined preparation criteria, and evaluated against well clarified standards could be a promising objective for administrators.

Advising/directing/supervising of doctoral students appears to be an ongoing institutional concern (Council of Graduate Schools, 1990, pp.6-8). As raised in the preface [pp.6-8], time to acquire the doctorate is believed to be related to the quality of the student-professor relationship. However, this relationship is not always perceived as the critical acquisition factor, as inadequate finances may be the biggest barrier to the timely completion of the thesis (Council of Graduate Schools, 1991, p.17).

Three questions, as listed in Table 12, that were posed to the panel of participants produced responses which were not predominantly negative or positive. Question 9 concerned with approving alternatives to the traditional thesis produced an opposed response, as did question 18 which was concerned with approving group or team research. What may be important here for administrators is the fact that both questions are in tune with developments within some science disciplines where alternatives to the traditional thesis are now permissible, and where group or team research is a reality. This strong cleft in the panel's

Table 12: **Actions the panel believes will most likely have ambiguous effects on Ph.D. degree**

COMPONENT*			PROGNOSIS		
	QU	ACTION	-VE**	NE	+VE
T	9.	Approving alternatives to the traditional thesis [e.g., a book or journal articles].	46#	13	41
T	13.	Requiring the written thesis be shorter than the existing norm [i.e., fewer pages].	30	32	38
R	18.	Approving group or team research [i.e., thesis research conducted by more than one student].	43	11	46

* **R** Issue related to original research component if Ph.D. degree
T Issue related to thesis preparation component of Ph.D. degree
** -VE means negative, NE means no effect, +VE means positive
# Frequency of response percentage as listed in Table 5

response, may represent a difference in opinion founded on this development in the sciences. In future research, it would be advantageous to have separate data from those disciplines where thesis alternatives and group research are accepted and from those disciplines where they are not accepted.

The third ambiguous response was stimulated by question 13, related to the hypothetical requirement that theses be shorter. For this question the response was without any strongly pronounced most likely outcome, with the negative effect, no effect, and the positive effect all receiving over 30 percent of the total response. Here an administrator could conclude that little would be gained by having a shorter thesis approved. Those in favour of such action may well be counterbalanced by those not in favour, because it would, they believe, be negative for the resultant degree. These three ambiguous actions require extensive reflection by administrators. If it is thought essential to implement an innovation, which could result in ambiguous [or negative] results, compensatory mechanisms are necessary.

Looking at the traditional Ph.D. degree, there are a number of actions or innovations related to its fundamental components which could be taken, and which the panel has predicted would improve the resultant degree. As has been pointed out, any movement in this direction would necessitate attention being given, particularly by university administrators, to the existing educational history, culture, and infrastructure. In addition, this attention must be international as well as national in perspective, for if a university wants to confer a Ph.D. degree that is accepted internationally, which certainly is the case among the four countries referred to in this thesis, that university cannot accept what would not be accepted elsewhere. To ensure international and national reciprocity, a Ph.D. degree program must have an academic standing on par with commonly accepted norms. Care also needs to be exercised when considering actions which may be counterproductive if the actions are implemented at the same time.

Turning to the area of non-traditional Ph.D. degrees, similar and dissimilar demands are placed on university administrators. Similar in the sense that evolutionary changes [e.g., approving a shorter thesis] may be initiated in both traditional and non-traditional degree programs, but certainly dissimilar in the sense that revolutionary changes [e.g., approving a two-track degree program] will be associated with non-traditional programs. A number of these programs are described in the literature, and several have characteristics that correspond with actions assessed favourably by the panel of participants.

Considering the number of parties which are involved in higher education [e.g., politicians, professional organizations, professors, proprietary interests, public, etc.], university administrators will inevitably be pressured during their involvement with the implementation of any innovation related to the Ph.D. degree. To eliminate, or at best reduce this pressure, administrators need to anticipate and act on those aspects which influence the implementation of innovations and to incorporate mechanisms which will compensate for negative effects.

Recommendations

Wisdom lies in the aphorism, which has been attributed to the American author and editor Henry Louis Mencken, that every complex problem has a simple obvious solution which is wrong. To suggest then that the Ph.D. degree can be assessed easily, and any deficiencies found wanting can be quickly corrected through some suitable innovation, would be a most unwise conclusion. What then can be concluded from the results of this exploratory research?

A. The results give researchers studying the Ph.D. degree an entrée which enables them to formulate hypotheses to test in their efforts to gain additional knowledge about the degree. It is recommended researchers undertake a study of a Ph.D. degree as it exists in one country, a geographical region, an entire university, or a single faculty. What differences exist between universities, departments, or disciplines [e.g., natural sciences and humanities] would be valuable research data to have.

B. The results could be used as a baseline for further research where an actual alteration or manipulation of one, or two, or all of the fundamental components of the degree are undertaken. Some form of longitudinal study incorporating a control sample, with all the necessary consideration to ethical concerns, is recommended. To maximize any effect induced by altering the components of the degree, researchers need to keep in mind those alterations which appear to hold the most potential for improving the doctorate.

C. The results cannot be generalized to a population because the panel was not randomly sampled from a population. However, some generalizations may be possible if those doing so believe their doctor of philosophy degree situation is compatible with what is described within this thesis. Caution with these generalizations is recommended.

D. The results suggest that a number of actions related to the fundamental components would result in an improved doctor of philosophy degree. Action which resolves the problematic issue of, what is appropriate doctoral research [research component] is recommended. This issue had the highest identification frequency, ana it was addressed by panelists from all of the four countries in the study. In addition to this issue there are several others which beg to be addressed. They had high identification frequencies and they were also identified by panelists from the four countries. These issues are as follows: the reason for, and the extent of, mandatory/required study/courses [study component]; improving the advising, directing, or supervising of students [study, research, and thesis components]; clarifying the standards for preparing and evaluating the doctoral thesis [thesis component]; and, improving the writing competencies of doctoral students [thesis component].

E. The results give some indication that several actions if implemented to improve the Ph.D. degree may result in ambiguous outcomes. Actions related to alternatives to the traditional thesis, a shorter thesis, and group or team research may, according to the panel's response, may cause both positive and negative outcomes for the doctorate. Further research is recommended to clarify why the panel in this research produced these ambiguous responses.

For university administrators then, what would be the wisest course of action? As detailed in Chapter IV, the methodology used in this study is a widely accepted prognostic research technique. Therefore the research results have a measure of legitimacy, and they reflect possible developments with respect to the Ph.D. degree. Although the degree has a long history and it is well established, something is amiss which is eliciting action from those sensitive to existing related problems [e.g., Association of American Universities (1990) – Appendix R]. Solutions are being sought. But as Mencken advises, there are no simple obvious solutions to complex problems.

The Ph.D. degree needs to be studied and its fundamental components more tightly defined. Relationships between and among these components have to be identified and their strength assessed, and from the myriad of variables that impact upon the degree the most critical need to be identified and studied. Before any substantive understanding of the doctor of philosophy degree is possible, an understanding which would allow accurate predictions related to the degree, considerable research will have to be undertaken. It is a long and demanding process from a conceptual framework to a theory.

APPENDICES

Appendix A: Letter requesting data on contemporary Ph.D. degree

09.05.89

Name
Title
Address

Re: ACADEMIC REQUIREMENTS FOR THE PH.D. DEGREE

Dear

Firstly, thank you for your attention to my request.

I am a doctoral student, and my thesis is related to the academic requirements for the Ph.D. degree.

Would you please forward information on the academic requirements for the Ph.D. degree(s) at your institution. A calendar or handbook describing the required number of courses, residency, completion time, **thesis/dissertation characteristics** (and options if permitted), language(s), etc., would be adequate.

Your earliest reply would be appreciated. A similar request is being made to a large number of institutions in the United States, and if you would like to receive a summary of the data, include your address card with the reply.

Sincerely,

Keith Allan Noble

Box 126, Lamoureux Hall
Faculty of Education
University of Ottawa
Ottawa, K1N 6N5
CANADA

Appendix B: Fundamental components of Ph.D. degree in Australia, Canada, Great Britain, and United States [1989]

INSTITUTION	COUNTRY	YEARS Min/Max	THESIS REQUIREMENTS	OPTIONS
Australian National University	AU	2/4	*	none
Brunel University	GB	3/*	original investigation testing an idea, understand relationship to wider field of knowledge	none
California Institute of Technology	US	3/*	*	journal articles
Carleton University	CA	2/*	original research contributing to knowledge	none
Colorado State University	US	*/10	independent intellectual achievement, contribution to wisdom, knowledge, or culture of field	none
Columbia University	US	*/7	original research	none
Concordia University	CA	*/4	*	none
Cornell University	US	3/*	imaginative contribution to knowledge	journal articles
Dalhousie University	CA	2/*	original scholarship	none
Edinburgh University	GB	*/5	original, significant contribution, knowledge of field, critical judgement, unified work	none
Heriot-Watt University	GB	2/*	independent contribution to knowledge, evidence of originality	none
Indiana University at Bloomington	US	*/7	original scholarly contribution, demonstrate critical ability, imagination, and synthesis	none

[cont.]

Appendix B [cont.]

INSTITUTION	COUNTRY	YEARS Min/Max	THESIS REQUIREMENTS	OPTIONS
Johns Hopkins University	US	*/*	original investigation worthy of publication	none
Massachusetts Institute of Technology	US	*/*	original research	none
Memorial University of Newfoundland	CA	2/*	original research	none
New York University	US	*/10	scholarly and exhaustive investigation, add to knowledge, or new significant interpretion	none
North Carolina State University	US	*/10	original investigation, contribution to knowledge	none
Northwestern University	US	*/10	original and significant research	none
Ohio State University	US	*/5	scholarly contribution to knowledge	none
Princeton University	US	4/*	independent technical mastery, enlarge/modify what is known or new significant treatment	none
Purdue University	US	*/*	individual research contributing to knowledge	none
Queen's University	CA	*/7	original, further knowledge	none
Rockefeller University	US	3/*	significant experimental or theoretical research	none
Rutgers University	US	3/*	original investigation of problem[s]	none
Stanford University	US	*/*	original contribution to scholarship or scientific knowledge	none

[cont.]

Appendix B [cont.]

INSTITUTION	COUNTRY	YEARS Min/Max	THESIS REQUIREMENTS	OPTIONS
State University of New York at Stony Brook	US	*/7	original and significant scholarly investigation	none
Texas A&M University	US	*/10	independent, original work of creditable literary scholarship	none
University of Adelaide	AU	2/4	original and critical thought, significant contribution	none
University of Alberta	CA	2/*	meet standards of reputable scholarly publications	none
University of British Columbia	CA	*/6	original research	none
University of California at Los Angeles	US	2/*	independent investigation	none
University of California at San Diego	US	*/7	*	none
University of Cambridge	GB	3/*	*	none
University of Colorado at Boulder	US	*/6	original investigation, mature scholarship, critical judgement	none
University of Connecticut	US	2/*	significant contribution to the field	none
University of Exeter	GB	2/*	*	none
University of Florida	US	*/5	independent investigation	creative writing
University of Georgia	US	*/6	originality in research, independent scholarship	none

[cont.]

Appendix B [cont.]

INSTITUTION	COUNTRY	YEARS Min/Max	THESIS REQUIREMENTS	OPTIONS
University of Illinois at Chicago	US	*/9	independent research	none
University of Lancaster	GB	3/*	original contribution to knowledge	none
University of Leeds	GB	3/*	original contribution to understanding of research subject	none
University of Manitoba	CA	*/7	original research or creative scholarship	none
University of Maryland at College Park	US	*/4	*	published works
University of Melbourne	AU	3/*	independent research, significant contribution	none
University of Minnesota - Twin Cities	US	*/5	originality, independent investigation, contribution to knowledge	published works
University of New Brunswick	CA	3/*	independent research, significant contribution to knowledge	none
University of New Mexico	US	*/5	independent research, competency in scholarly exposition	none
University of North Carolina at Chapel Hill	US	*/8	contribute fresh outlook or knowledge, mastery of methodology	
University of Rochester	US	*/7	original, critical or synthetic treatment, independent research	none
University of Saskatchewan	CA	*/6	original investigation, mature scholarship, critical judgement, contribution to knowledge	none

[cont.]

Appendix B [cont.]

INSTITUTION	COUNTRY	YEARS Min/Max	THESIS REQUIREMENTS	OPTIONS
University of Southern California	US	*/8	original investigation, technical mastery, independent research, scholarly ability	none
University of Stirling	GB	2/6	original investigation, assess ideas critically, relate to wider field	none
University of Sydney	AU	2/5	directed independent research, significant contribution to knowledge	none
University of Tasmania	AU	*/*	substantial original contribution to knowledge, related to disciplines	none
University of Toronto	CA	2/6	independent investigation, significant contribution	none
University of Utah	US	3/*	original and independent scientific or scholarly research or artistic creativity	none
University of Virginia	US	3/7	independent research	none
University of Wales	GB	3/*	contribution to learning, systematic study related to body of knowledge	none
University of Washington	US	3/*	significant contribution to knowledge, indicates training in research	none
University of Western Ontario	CA	3/*	original contribution	none
Washington University	US	3/*	original scholarly work, mastery of knowledge	none

* Data not detailed, or data could not be interpreted from the handbook.

Appendix C: Prescriptive literature extracts and key point summaries

1. "1. The norm of a four year doctorate should be enforced by the universities. The norm of four academic years plus a summer or two, or a little over three calendar years in actual study, is now the general practice and should remain so.... 2. The program for doctoral training should be tightened. By "tightening" I mean a clearer, more compact, more specified program of study including more supervision and direction by the faculty.... 3. The dissertation should be shorter. The argument for the shorter dissertation...seems to me compelling even in [especially in] the most wordy of the word disciplines.... 4. As I have tried to show, the system and the bodies of knowledge have grown to the place where something had to change. What is changing slowly and reluctantly is the idea that the Ph.D. is the absolute top of the mountain. The development of post-doctoral work is here and it ought to be better rationalized and programmed within the present system.... 7. The support of doctoral students should be regularized and they should be expected to pay more of their own way. In order to normalize the doctoral program, the system somehow has to solve the problem of student support.... 9. Industry should provide more support for graduate schools, and more free support. The graduate enterprise is costly and the bill must be paid. I have already recommended that the direct beneficiaries, the candidates themselves, pay more of their own way, but even so, they will bear only a fraction of the true cost of their training.... 11. The writing deficiencies at the graduate level should be attacked directly...Poor writing and the associated bad organization of research and scholarly reports is so general across the fields, so indicative of unclear thinking and analysis, and so costly of the time and resources of others that some intensive efforts at improving the situation seem to be required.... 13. Training in teaching should be handled differently within the doctoral program...All doctoral candidates should have some actual teaching experience as part of their doctoral requirements, not less than half time for half a year."

Key points: correct writing deficiencies, decrease completion time, decrease length of dissertation, financial support, improve faculty supervision, incorporate teacher training, increase industry involvement, provide post-doctoral program

Source: Berelson (1960, pp.234-250)

[cont.]

Appendix C [cont.]

2. "[1] We ask too much course work, too much unrelated to their subject of research, because we distrust their undergraduate preparation and because we are thinking of the probability of their being asked to teach these subjects. But surely we want to turn out students who can learn, rather than students who have learnt; [2] Do we not over-emphasize training in technique to the detriment of the development of imagination and judgement - even of excitement? Are we not concerned too often to screen out the mediocre rather than to develop the excellent?; [3] Do we not encourage students to write [or fail to discourage from writing] too big theses on too great subjects? Surely we want to give them a trial run at research under direction. But their big work should be done later by them as independent scholars. I am horrified at the number of really able young men with uncompleted Ph.D. theses. It is not all their fault; [4] Should we not identify these students for whom something different is appropriate and provide for each of them close association from the very beginning with a member of the staff, who would direct their early preparation and later research and thesis writing; [5] Should we not be careful to limit entrance...to the really first class?; [6] Should we not make sure that students have financial support that enables them to complete their doctorate in three years?"

Key points: closer supervision, entry restriction, excessive course work, financial support, innovative [imagination and judgement] degrees, overemphasis on technique, reduce completion time, theses and theses topics too big

Source: Bladen (1962, pp.52,53)

[cont.]

Appendix C [cont.]

3. "[a] There should be a change of emphasis towards shorter periods of post-graduate study more closely matched to the needs of employment; the move from research to selected advanced course work should be accelerated; [b] More attention should be given to education and training throughout the career and after experience of employment. Post-experience students, whether on courses lasting a year or very much less, should form a very rapidly rising proportion of the total postgraduate population. More flexible course arrangements should be developed to make it easier for mature persons to participate; [c] The content of postgraduate education and training should be reviewed in the light of the requirements of industry and the schools. This is already taking place but we believe it must happen more quickly; [d] In particular, the universities should examine the nature and purpose of the Ph.D. degree from first principles, and consider drastic action to bring within its scope other forms of postgraduate training more closely orientated to the requirements of industry. The aims of the Ph.D., and the implications of possible changes for science and technology and for qualified manpower, need to be considered. The time is long overdue for the universities to start experimenting boldly with the Ph.D. and with the regulations which govern the award of this degree; [e] Industry should be intimately involved in the planning and conduct of postgraduate education and training which is intended to meet its requirements; [f] Continuing experiments in new approaches to postgraduate training should be encouraged by the University Grants Committee, the Science Research Council and by appropriate government agencies."

Key points: decrease completion time, employment orientation, increase course work, involve industry, innovative degrees and regulations, mature student entry facilitation, post-doctoral courses available, reduce research emphasis

Source: Swann (1968, p.67)

[cont.]

Appendix C [cont.]

4. "In short the Ph.D. is a good degree and is appropriately broad in scope. It is, however, insufficiently categorized in the majority of academic departments with regard to what is expected of the student in terms of performance and time. The four-year norm for the total period of graduate study is much to be desired. The four year program should lead to a stronger rather than a weaker degree if it is properly conceived and properly administered. Specifically, the faculty should be more closely involved in the Ph.D. program of the given student from beginning to end. They should insist on shorter dissertations and should encourage a greater breadth in the topics and treatments of the dissertations. There seems no reason why the dissertation should consist of one massive study presented in one massive manuscript. A variety of experiences and of presentations might well provide more valuable educational training. The requirement of supervised internships in college teaching is to be encouraged in most Ph.D. fields, but such experience should be designed to benefit the doctoral student and not serve as a means of providing cheap instruction...."

Key points: decrease completion time [four years], alternatives to dissertation, innovative dissertations [topics and treatments], increase faculty involvement, shorter dissertations, teaching internships

Source: Spurr (1970, p.138)

5. "[1] Graduate education is essentially a vehicle of inquiry, which leads the mind out, and as such, graduate education is to be thought of primarily as being indeed education rather than training...; [2] As a governing force in graduate education, the possibilities of inquiry at any given moment should have a higher claim than existing professional demands...; [3] The graduate school fosters the advancement of inquiry both intensively and extensively [innovation]...; [4] Programs of study should be defined primarily by arriving at the closest match between the intellectual bent of the individual student and the whereabouts of the knowledge to which clusters of professors are drawn by their questioning...; [5] graduate study should carry the student with the least avoidable delay to attack the questions that are most worth answering...."

Key points: increase research emphasis, innovative degrees, minimize completion time, optimal supervision

Source: Storr (1973, pp.84-92) [cont.]

Appendix C [cont.]

6. "Much of the supervisors' uneasiness about the supervision process stems from the inherent tension between the form and purpose of higher degree studies and the expected outcome of such studies; between, on the one hand, supervised research training and, on the other, a substantial contribution to learning and an original contribution to knowledge. Much of the confusion and many of the possible break downs in supervision can be overcome or prevented if expectations are clarified at an early stage. Institutions and departments have to articulate their expectations of students' prerequisite knowledge and skills, of students' commitment to intensive work over a lengthy research period. Supervisors also need to clarify specific expectations concerning their professional relationship with students. Equally, students need to articulate their expectations with regard to facilities, resources, contact with the supervisor, guidance, assistance and direction."

Key points: degree is research training, improve supervision, theses add to knowledge [product], theses add to learning [process]

Source: Moses (1984, p.159)

7. "These developments will, however, emphasize the need in our future Ph.D. graduates to achieve high international standards in personal research accomplishment, yet provide a broader background of intellectual understanding and the encouragement of wider social attitudes. To these ends, I would suggest the following new directions: 1. Encourage Ph.D. programmes to embrace more than one type of project with the possibility of supervision across disciplinary boundaries; 2. Reduce the content but not the standard of the Australian Ph.D. thesis [which is greater than those in North America, Britain and much of Europe] to allow the introduction of relevant professional course work, probably available in existing master's programmes; 3. Include some modules of business management course work to enhance the effectiveness of Ph.D. graduates in commerce and industry; 4. Loosen the career links between super -visors and Ph.D. candidates with greater use of supervision committees to provide multiple role models and improve socialization of candidates; 5. Improve counselling of candidates at the entry point to Ph.D. programmes and encourage employment between completion of honours degree and Ph.D. entry."

Key points: alternative to theses, business management courses, credit for external studies, encourage employment before Ph.D., improve pre-doctoral counselling, increase role of supervisory committees, inter-disciplinary supervision, shorter theses

Source: Stranks (1984, p.175) **[cont.]**

Appendix C [cont.]

8. "Perhaps the most basic need is to broaden the curricular content of the course of study that prepares future university faculty. They need more than mastery of a narrowly defined speciality in order to carry out their extended and diverse responsibilities in the modern university...the individual clearly committed to a career in basic research would be identified early in his or her career and would be encouraged to pursue the traditional path toward a Ph.D.. Others might be more interested in synthesis and explication, in problem-oriented applied work, or in formal teaching. Each should be able to find some modification of curriculum and some culminating project that might differ from a traditional research-based dissertation.... A major effort should be undertaken to introduce a period of practical experience into the process of preparing future faculty members.... Alternatively, or in addition, periods of internships and other practical experience could become part of the doctoral program. The university of Chicago includes a graduate internship in its doctoral programs (Groneman and Lear, 1985), and some institutions use the model of cooperative education at this level. In addition to the inclusion of practical experience into doctoral preparation for an academic career, alternatives to the current research dissertation as a requirement for the Ph.D. might also be considered as a way of reflecting the more varied scholarly functions expected from faculty in the contemporary university. Doctoral requirements, for instance, could include one or more of the following: • carrying out a thorough impact analysis of a proposed policy or project; • writing an extensive review and critique of a field that explains its principal methodological and paradigmatic debates in terms understandable to a non-expert; • developing a complete annotated and critical bibliography; • designing an innovative course outline and syllabus combining pertinent materials from different disciplines; • developing significant new software for educational use of computers and other technology."

Key points: alternatives to dissertation, increase breadth of degree, internship, practical teaching experience

Source: Lynton and Elman (1987, pp.139-142)

[cont.]

Appendix C [cont.]

9. "The most pressing area of reform of graduate education is to guarantee prompt recognition of genuine student innovation. Since the preferred academic mechanism for such recognition is publication with a scholarly journal or press, that mechanism should be formally admitted into graduate education. Any master's or doctoral candidate enterprising enough to publish several articles with reputable journals, or perhaps even a book with a reputable press, should be allowed to submit that achievement in lieu of the traditional thesis. The profession requires no more than this from professors' intent upon tenure, promotion or prestigious grants: why, then, should the profession demand more of apprentices to research; the training program itself should take the form of a year of teaching internship, commencing in the spring, once the regular academic year has been completed.... The advantage of a teaching internship is that it could be implemented with the full range of existing academic qualifications, rather than the doctorate alone."

Key points: acceptance of publications in lieu of theses, teaching experience

Source: Cude (1987, pp.85,86,101)

10. "The working group recommends the inclusion of taught elements in doctoral programmes and believes that these: i) are valuable in improving the quality of the thesis; ii) promote the study in depth of topics which are related to the thesis research and thereby open new areas to the student; iii) ensure that all students in a department share certain basic knowledge of their discipline and are often the most efficient method of conveying such information; iv) are useful in integrating students into academic departments and in overcoming some of the isolation of research activity; v) broaden knowledge of the discipline [which will be particularly valuable for any subsequent academic research or teaching which students may undertake; vi) used in moderation will not lead to a prolongation of the time required to complete the Ph.D. thesis.... The working group takes the view that doctoral programmes which involve a substantial taught component with only a limited research project, although they may be of value for professional training, cannot be appropriately termed Ph.D.s. The group considers that the successful Ph.D. thesis should always embody a substantial piece of original research."

Key points: mandatory taught courses, necessity of original research

Source: Ash et al. (1988, pp.3,4)

Appendix D: Terms associated with doctoral research in United States

ORIGINALITY, SIGNIFICANCE, AND INDEPENDENCE

"'What is original may not be significant and what is significant may not be original,' remarked one graduate dean in reference to Berelson's now classic discussion of the traditional conception of the dissertation. Thirty years ago Berelson was at pains to point out that the notion of the dissertation as an original and significant contribution to knowledge was only a statement of intent. Definition of the terms was left to the departments, and serious questions were being raised not only about the realization but about the appropriateness of the aim.

The idea of **originality** was especially suspect given the extent of team research in the sciences, and the notion of 'significant contribution to knowledge' received some hard questioning as well. According to Berelson's findings, the alternative to judging the dissertation by these traditional terms was to consider it an instrument of research training, 'a trial run in scholarship and not a monumental achievement. The primary test would be, in other words, whether it contributed to the student's knowledge, not the world's.' When asked, 'should the doctoral dissertation be regarded more as a training instrument than as an original contribution to knowledge?' 55 percent of the deans, 45 percent of the graduate faculty, and 40 percent of the recent degree recipients Berelson surveyed answered yes.

Despite the trend thirty years ago toward judging the dissertation by a different, more realistic standard, originality, significance, and independence have not disappeared from the vocabulary used to describe distinguishing characteristics of the doctoral research project and product. Now as then, defining the terms is difficult, and they continue to mean different things in different fields.

Citing Supreme Court Justice Potter Stewart's frustrated statement that he could not define pornography but that he knew it when he saw it, one university report suggested that defining originality presented similar difficulties. In its most general sense, 'original' describes research that has not been done previously or a project that creates new knowledge; it implies that there is some novel twist, fresh perspective, new hypothesis, or innovative method that makes the dissertation project a distinctive contribution. An original project, although built on existing research, should not duplicate someone else's work.

Significant as applied to doctoral research projects and dissertations is also subject to debate. A significant piece of work provides information that is useful to other scholars in the field and, ideally, is of such importance that it alters the thinking of scholars in the student's field of study. A further question is whether the dissertation itself is a significant document or whether the term refers

[cont.]

only to the nature and quality of the research. It is difficult, asserts one universiy report, to argue that dissertations are themselves significant when in many fields they play a minor role as scholarly resources. Particularly in the humanities and the softer social sciences, dissertations are not expected to be cited by scholars in their published work. The notion that doctoral dissertations are significant contributions to knowledge thus seems to represent an ideal rather than a quantifiable fact.

Independence or autonomy is intertwined with 'originality,' and its definition also varies by field. It is dependent on the nature of the research, the resources needed, the advisor's style, practices common to the discipline, and custom in the student's program. According to the report from one university, the experience of most students seems to fall in a three-point spectrum from high to low autonomy.

In the humanities, at the most autonomous end of the spectrum, originality is related closely to independence. A student, although receiving guidance from a dissertation advisor, is usually responsible for both conception and execution of the doctoral research project. Moreover, a teaching assistant's duties, for which the student receives support, are usually unrelated to the dissertation research.

Midway on the independence-autonomy spectrum, a student may develop the idea for the dissertation through interaction with the dissertation director and occasionally with the other committee members, and the dissertation director may apply for a grant to support the research. The faculty advisor may retain full supervisory control of the student's work on the research project or permit the student to proceed independently, merely monitoring the progress of research. Assistantship support is typically provided by the grant.

Autonomy is most constrained in the sciences where students often join ongoing research projects for which the principal investigator has received funding...the idea for the dissertation originates with the principal investigator and grows out of the larger project. The student, whose assistantship is funded by the research grant, must develop, refine, define, and do the research on the topic, contributing to the design of the project, to the measurement and collection of new information, and to the analysis and interpretation of information.

At the low end of the scale when a doctoral student is part of a team pursuing an ongoing research project, the status of the student as an independent researcher is subject to real question and is heavily dependent on the research practices and personality of the principal investigator. In such cases, one university report recommended candid discussion among the faculty, representative students, and the graduate dean, with the objective of encouraging research practices that protect

[cont.]

Appendix D [cont.]

the academic freedom of the faculty and promote the intellectual growth of the individual student.

Despite differences among disciplines, the consensus was that 'original' does not mean 'in isolation.' The idea for the dissertation project and the approach taken need not be developed soley by the student. It is expected, however, that the student should develop and carry out the research project relatively independently and be able to demonstrate to the satisfaction of the advisory committee what portion of the research represents the student's own thinking."

Source: Council of Graduate Schools (1991, pp. 8-10)

Appendix E: Characteristics of doctoral theses in United States

"As a record of the research experience, stated one university report, 'the dissertation may take different forms, depending on the nature of the research itself, the customs of the disciplines, the culture of the university, and the pedagogical judgement of the student's mentor,' The document should, however, demonstrate breadth of scholarship, depth of research, and ability to investigate problems independently and efficiently.

'Regardless of the differences certainly and naturally existing among the various fields and disciplines of study,' stated another report, 'the dissertation must be an extended, coherent, written work of original research, demonstrating a doctoral candidate's comprehensive knowledge and mastery of methodological, historical, topical, empirical, and theoretical issues relevant to the chosen research subject. It must be a significant contribution to scholarship. It must contain the results of extensive critical research of documentary source materials, laboratory work, and/or field work.'

The doctoral dissertation, many university reports agreed, should reveal the student's ability to analyze, interpret, and synthesize; demonstrate thorough knowledge of the literature relating to the project or at least acknowledge prior scholarship on which the dissertation is built; describe the methods and procedures used; present results in a sequential and logical manner; and display the student's ability to discuss fully and articulately the meaning of the results. In the sciences, the work must be described in sufficient detail to permit an independent investigator to replicate the results.

One pocket of dissent was reported in such scientific disciplines as engineering, physics, and chemistry. Some faculty members in these subfields believe that the purpose of the dissertation process is to enable the student to develop research skills as part of a team engaged in ongoing experimental work. Dissertations directed by these faculty members can 'read like technical manuals, the main purpose of which is to allow the next student to pick up from where the previous one left off.' Setting the dissertation results in the context of previous work is important, these faculty members generally agreed, but they placed primary emphasis on the dissertation contributing to the 'team effort' and staking out territory for the student's future work."

Source: Council of Graduate Schools (1991, pp.7,8)

[cont.]

Appendix E [cont.]

RECOMMENDATION

"Although the 'traditional' dissertation as a unified work with an introduction that states an objective, a literature review, a presentation of the methodology or procedures to be used, and a concluding discussion of results should be respected, flexibility with respect to form also should be permitted. Some disciplines, mainly in the sciences, already permit inclusion in the dissertation of the research papers or scholarly articles published by the student. This practice should be adopted more frequently by the humanities and the social sciences. Whatever the discipline, the published work must be logically connected and integrated into the dissertation in a coherent manner. Binding reprints or collections of publications together is not acceptable as a dissertation in either format or concept."

Source: Council of Graduate Schools (1991, p.4)

Appendix F: Examples of stability measurement computation

	RATINGS								
	1	2	3	4	5	6	7	8	9
Round 2 response	0	0	1	4	9	8	5	3	2
Round 3 response	0	0	1	6	11	6	1	3	4
Absolute difference in numbers of panelists selecting rating, Rounds 2-3 [a]	0	0	0	2	2	2	4	0	2
Total units of change [b]	12								
Net person-changes [c]	6								
Number of participants	21								
Percent change [d]	28.57% [**unstable**]								

	RATINGS								
	1	2	3	4	5	6	7	8	9
Round 3 response	0	0	1	6	11	6	1	3	4
Round 4 response	0	0	2	6	10	7	1	3	3
Absolute difference in numbers of panelists selecting rating, Rounds 3-4 [a]	0	0	1	0	1	1	0	0	1
Total units of change [b]	4								
Net person-changes [c]	2								
Number of participants	21								
Percent change [d]	9.52% [**stable**]								

[a] These numbers are the absolute differences between the histograms for the two successive rounds.

[b] These numbers are the sum of the absolute differences in the histograms.

[c] Net changes are total units of change divided by 2.

[d] Percent change is net change divided by the number of participants.

Source: Adapted from Scheibe, Skutsch, and Schofer (1975, p.279)

Appendix G: Fields where Delphi technique has been applied

1. Chemical Industry
2. Comment Analysis
3. Communications
4. Computers
5. Corporate Environment
6. Cost Effectiveness
7. Cross Impact Technology
8. Decision Making
9. Drugs
10. Economic Analysis/Development
11. Education
12. Electronics
13. Employee Benefits
14. Energy
15. Experts
16. Exploratory Development
17. Forecasting
18. Futures Analysis
19. Goals
20. Group Value Judgements/Techniques
21. Housing
22. Industrial Engineering
23. Information Systems
24. Instruction
25. Land Use
26. Law of Diminishing Returns
27. Mapping
28. Marketing
29. Medicine
30. Models
31. Panel Experts
32. Personnel Administration
33. Planning
34. Quality of Life
35. Quantitative Analysis
36. Recreation
37. Research
38. Social Environment/Change
39. Think Tanks
40. Transportation Planning

Source: adapted from Worsham (1980, pp.2-13)

Appendix H. Delphi technique bibliography related to higher education

Adelson, M. Planning education for the future: Comments on a pilot study. American Behavioral Scientist, 1967, 10 [March], 1-12, 21-31.

Dowell, P.E. Delphi Forecasting in Higher Education [Doctoral Dissertation, 75-22,262]. Nashville: George Peabody College for Teachers, 1975.

Fazio, L.S. The Delphi. Assessment and Evaluation in Higher Education, 1985, 10[2], 147-158.

Helmer, O. The Use of the Delphi Technique in Problems of Educational Innovation [P-3499]. Santa Monica: RAND Corporation, 1966.

Huckfeldt, V.E. Imaging future organization in higher education, In Popper, S.H., [Ed.], Imaging Future School Organizations. Minneapolis: University of Minnesota, 1972. 11-27.

Huckfeldt, V.E., Judd, R.C. Methods for Large-Scale Delphi Studies. Boulder: National Center for Higher Education Management, 1975.

Judd, R.C. Use of Delphi methods in higher education. Technological Forecasting and Social Change, 1972, 4, 173-186.

Lipsetz, A.H. Delphi as an Intervention Technique in Developing a Plan of Change for the Student Affairs Office at the Ohio State University [Doctoral Dissertation]. Ohio State University, 1972.

McLeod, T.A. A Study to Identify the Goals of a Voluntary Higher Education Consortium by Utilization of the Delphi Technique [Doctoral Dissertation]. University of Alabama, 1973.

Morrison, J.L. Global Change: Implications for the Future of Higher Education [International Newsletter Number 13]. Guildford: Society for Research into Higher Education and Personal Research Incorporated. 1990.

Nadeau, G.G., Donald, J.G., Konrad, A., Tremblay, L. Critères et Indicateurs de Qualité et d'Excellence dans les Collèges et les Universités du Canada / Criteria and Indicators of Quality and Excellence in Canadian Colleges and Universities. Moncton: Université de Moncton [Delphi study in progress].

Peterson, R.E., Uhl, N.P. Formulating College and University Goals. Princeton: Educational Testing Service, 1977.

Preble, J.F., Rau, P.A. Planning in higher education: Multiple scenario forecasting. Planning for Higher Education, 1986, 14[2], 1-6.

Uhl, N.P. Identifying Institutional Goals [ERIC/ED 049713]. Durham: National Laboratory for Higher Education, 1971.

Appendix I: Panel of participants [with titles effective in 1989]

PARTICIPANT	COUNTRY	ACADEMIC/PROFESSIONAL QUALIFICATIONS
Albee, Ph.D. Arden	US	Graduate Studies Dean, California Institute of Technology* [offers Ph.D. thesis option]
Apps, Ph.D. Jerold W.	US	Professor, Continuing Education, University of Wisconsin [Madison]*; author of Higher Education in a Learning Society (1988)
Arzac, Ph.D. Adriana	US	Executive Director, International Society for Intercultural Education, Training, and Research
Bélanger, Ph.D. Charles H.	CA	Vice-President [Academic], Laurentian University; former Editor, Canadian Journal of Higher Education
Bingham, Ph.D. Eula	US	Dean, Graduate Studies and Research, University of Cincinnati*
Bock, Ph.D. Robert M.	US	Dean, Graduate School, University of Wisconsin [Madison]*
Bond, Ph.D. Sheryl	CA	Director, Centre for Higher Education Research, University of Manitoba
Bondi [Sir] Hermann	GB	President, Society for Research into Higher Education; Master of Churchill College, University of Cambridge
Bottomley, Ph.D. David	GB	Assistant Registrar, Council for National Academic Awards
Boud, Ph.D. David	AU	President, Higher Education Research and Development Society of Australasia
Brazziel, Ph.D. William F.	US	Coordinator, Higher Education Programs, University of Connecticut*; written on corporate Ph.D. programs
Breslauer, Ph.D. Helen J.	CA	Senior Research Officer, Ontario Confederation of Univ. Faculty Assocs.
Bryan, Ph.D. Ingrid	CA	Dean, Faculty of Arts, Ryerson Polytechnic Institute
Calvin, Ph.D. Lyle D.	US	Dean, Graduate School, Oregon State University*

[cont.]

Appendix I [cont.]

PARTICIPANT	COUNTRY	ACADEMIC/PROFESSIONAL QUALIFICATIONS
Carlson, Ph.D. Walter O.	US	Associate Vice-President, Research and Grad. Studies, Georgia Institute of Tech.*
Carpenter, Ph.D. D. Stanley	US	Executive Secretary-Treasurer, Association for the Study of Higher Education
Carter [Sir] Charles	GB	Member, Policy Studies Institute; former university Vice-Chancellor; author of Higher Education for the Future (1980)
Casarett, Ph.D. Alison P.	US	Dean, Graduate School, Cornell University* [offers Ph.D. thesis option]
Chandler, Ph.D. John W.	US	President, Association of American Colleges
D'Arms, Ph.D. John H.	US	President, Association of Graduate Schools of the Association of American Universities
Dick, Ph.D., Gale	US	Dean, Graduate School, University of Utah*
Dowling, Ph.D. John	US	Distinguished Professor of Romance Languages; former Dean, Graduate School, University of Georgia*
Duhamel, Ph.D. Ronald J.	CA	Former Professor, University of Manitoba; co-author of, Academic Futures (1987); Member of Parliament [St. Boniface]
Edgerton, Ph.D. Russell	US	President, American Association for Higher Education
Edwards, Ph.D. A.D.	GB	Professor; Dean, Faculty of Engineering, Heriot-Watt University
Fienberg, Ph.D. Stephen	US	Dean, College of Humanities and Social Sciences, Carnegie-Mellon University*
Francis, Ph.D. Bruce	US	Vice-President of Academic Affairs, Walden Univeresity [adults only university]
Garcia, Ph.D. Maria Emma	US	1987 Ph.D. thesis - Preventing the "All But Thesis" Phenomenon; Associate, Ronningen Research & Development Company

[cont.]

Appendix I [cont.]

PARTICIPANT	COUNTRY	ACADEMIC/PROFESSIONAL QUALIFICATIONS
Gaudiani, Ph.D. Claire	US	Project Director, Academic Alliances
Hamilton, Ph.D. Russell G.	US	Dean, Vanderbilt University*; Boardmember, Council of Graduate Schools and Association of Graduate Schools
Herron, Ph.D. Jerry S.	US	Assistant Professor, Wayne State University; author of, Universities and the Myth of Cultural Decline (1988)
Hersom, Ph.D. Naomi L.	CA	President, Mount St. Vincent University; President, Canadian Society for the Study of Higher Education
Hewitt, Ph.D. R.G.	AU	Associate Professor; Dean, Faculty of Science, University of Sydney
Holmes, Ph.D. Brian	GB	Professor, Institute of Education, Univ. of London; studied and written on higher education degrees from several countries
Holt, Ph.D. Robert T.	US	Dean, Graduate School, University of Minnesota [Twin Cities]*
Hostler, Ph.D. Charles L.	US	Vice-President Research, Graduate School, Pennsylvania State University*
Hughes, Ph.D. Kenneth R.	CA	President, Canadian Association of Graduate Schools; Dean of Graduate Studies, University of Manitoba
Jagtenberg, Ph.D. Thomas	AU	Director of Postgraduate Studies, Dept. of Sociology, University of Wollongong
Keepes, Ph.D. Bruce D.	AU	Programme Coordinator, C.A.E. Sydney; written on postgraduate supervision
Koran, Ph.D. John J.	US	Associate Dean, Graduate School, University of Florida* [offers Ph.D. thesis option]
LaPidus, Ph.D. Jules B.	US	President, Council of Graduate Schools
Liebman, Ph.D. Judith S.	US	Dean, Graduate College, University of Illinois [Urbana-Champaign]*

[cont.]

Appendic I [cont.]

PARTICIPANT	COUNTRY	ACADEMIC/PROFESSIONAL QUALIFICATIONS
Loder, M.A. Cari P.J.	GB	Research Assistant, Centre for Higher Education Studies, University of London; Ph.D. degree student
McLennan, Ph.D. Barry D.	CA	Associate Dean, College of Graduate Studies and Research, University of Saskatchewan
Minkel, Ph.D. C.W.	US	Dean, Graduate School, University of Tennessee [Knoxville]*
Moss. Ph.D. Thomas H.	US	Dean, Graduate Studies and Research, Case Western Reserve University*
Nightingale, Ph.D. Peggy	AU	Member, Professional Development Centre, University of New South Wales; Editor, HERDSA Bulletin
Peters, Ph.D. Thomas B.	US	Director, Graduate Records, University of Connecticut*; recent graduate (1989), thesis topic on doctoral program review.
Phillips, Ph.D. Estelle M.	GB	Lecturer in Occupational Psychology, Birkbeck College, University of London; worked at Erasmus University, Rotterdam planning a European doctoral program; co-author of, How to Get a Ph.D. (1987)
Plotkin, Ph.D. Allen	US	Chairman, Aerospace Department Chairmen's Association
Prange, Ph.D. W. Werner	US	Former Vice-Chancellor, University of Wisconsin [Green Bay]; co-author of, Tomorrow's Universities (1982)
Ross, Ph.D. Christopher	CA	Associate Professor, Graduate Studies and Research, Concordia University; Director, Joint Ph.D. Management Program
Royster, Ph.D. W.C.	US	Vice-President, Research and Graduate Studies, University of Kentucky*
Schuster, Ph.D. Jack H.	US	Associate Professor of Education and Public Policy, and Director of Ph.D. program in higher education, Claremont Graduate School; co-author of, American Professors: A National Resource Imperiled (1986)

[cont.]

Appendix I [cont.]

PARTICIPANT	COUNTRY	ACADEMIC/PROFESSIONAL QUALIFICATIONS
Sheridan, Ph.D. Judson D.	US	Dean, Graduate School, University of Missouri [Columbia]*
Skamene, M.D., Ph.D. Emile	CA	Senior Immunology Physician, Montreal Gen. Hospital; Assoc. Prof., McGill University
Slater, Ph.D. T.F.	GB	Professor and Head, Department of Biology and Biochemistry, Brunel University
Sublett, Ph.D. Roger H.	US	Executive Vice-President, Association for Continuing Higher Education
Thompson, M.D., Ph.D. David	CA	Senior Immunology Physician, Montreal Gen. Hospital; Assoc. Prof., McGill University
Wagner, Ph.D. Norman E.	CA	Chairman of the Board, Alberta Natural Gas Company Limited; member of the Canadian Society for the Study of Higher Education
Walker, Ph.D. C.P.	GB	Head, Criminal Justice Studies, University of Leeds
Washington, Ph.D. Arthur C.	US	Executive Secretary, National Institute of Science
Watson, Ph.D. Cicely	CA	Professor and Higher Education Chairperson, Ontario Institute for Studies in Education
White, Ph.D. James P.	US	Legal Education Consultant, Association of American Law Schools
Wilson, Ph.D. Edward N.	US	Dean, Graduate School of Arts and Sciences, Washington University*
Woodruff, Ph.D. Gene L.	US	Dean, Graduate School, University of Washington*
Yamauchi, Ph.D. Edwin	US	Director, Institute for Biblical Research, Miami University

Composition: AUSTRALIA [AU] = 5; females = 1, males = 4
CANADA [CA] = 13; females = 5, males = 8
GREAT BRITAIN [GB] = 9; females = 2, males = 7
UNITED STATES [US] = 40; females = 7, males = 33
Totals: 67 15 52

* Leading Ph.D. degree granting & research institution in United States (The Chronicle of Higher Education, 1988, p.64)

Appendix J: Letter requesting participation on panel

June 30, 1989

Name
Title
Address

Re: **INTERNATIONAL RESEARCH ON THE DEGREE PHILOSOPHIAE DOCTOR**

Dear

You are busy no doubt, so I will be brief.

This letter will introduce Keith Allan Noble, a doctoral (Ph.D.) candidate in the Faculty of Education. With the approval of the Educational Studies section, Mr. Noble is conducting research on the degree Philosophiae Doctor for his thesis.

Your kind cooperation in participating on an international panel would be appreciated. This panel consists of eminently qualified personnel, from Australia, Canada, Great Britain, and the United States, all having academic and/or professional experience with the Ph.D. degree. The study will necessitate three or four **short questionnaires** over the next six months, and Mr. Noble is well aware of the confidential nature of individual responses.

Thank you in anticipation of your valuable insights. This study will make a significant contribution to the literature on the Ph.D. degree, and **a summary of the findings will be forwarded to you** once the research is completed.

Sincerely,

Robert R. O'Reilly, Ph.D.
Professor and Director
Educational Studies
Faculty of Education
University of Ottawa
Ottawa, K1N 6N5
CANADA

Att. Questionnaire No. 1

Appendix K: Round 1 questionnaire

CONFIDENTIAL

Code Number: ________ Date Mailed: ________

INTERNATIONAL RESEARCH ON THE DEGREE PHILOSOPHIAE DOCTOR

Your kind assistance, which will enable me to complete my doctoral degree, is gratefully appreciated. Keith Allan Noble

A modification of the Delphi technique will be used for this study. The Delphi technique is designed to facilitate the exchange of ideas, encourage in-depth thinking, and provide an **anonymous** forum to clarify understanding about an area of concern.

A carefully selected panel of **knowledgeable** people is asked to deliberate on relevant issues through an iterative rounds process. The objective is to generate a consensus of opinion on each issue. When consensus is achieved on an issue, or when the majority of the opinion is stable, the issue is dropped from subsequent rounds.

In the first round of this study you are asked to define relevant issues which you believe are, or may be, the most **problematic** with respect to three components of the Ph.D. [or D.Phil.] degree. A list of these issues will then be compiled and returned to you in round two, for your initial opinion.

Please interpret all statements in relation to the Ph.D. [or D.Phil.] degree with which you are most familar. And note that thesis and dissertation are considered **synonymous** in this study.

To expedite the rounds process, please complete and mail your questionnaire **within two weeks after receipt**. Thank you. An addressed return envelope is provided for you.

As this study involves a **restricted international panel**, it is most important that you participate in all of the rounds.

OVER PLEASE

Appendix K [cont.]

STUDY COMPONENT

This component refers to prescribed study which would be undertaken by the doctoral student. It incorporates the **amount** of study, the **method** of study, and **all other aspects** of doctoral studies [e.g., interdisciplinary courses, necessity of courses, number of courses, types of courses, usefulness of courses, etc.].

Please define the three issues which you believe are, or may be, the most problematic with respect to the study component of the Ph.D. [or D.Phil.] degree with which you are most familiar.

1. ____

____

____

____

Summary [key word or phrase]: ____________________

2. ____

____

____

____

Summary [key word or phrase]: ____________________

3. ____

____

____

____

Summary [key word or phrase]: ____________________

OVER PLEASE

Appendix K [cont.]

RESEARCH COMPONENT

This component refers to the research conducted by the doctoral student. It incorporates the **purpose** of the research, **emphasis** of the research, and **all other aspects** of doctoral research [e.g., business/industry involvement, financial assistance, options in lieu of research, originality, significance of research, types of research, etc.].

Please define the three issues which you believe are, or may be, the most problematic with respect to the research component of the Ph.D. [or D.Phil.] degree with which you are most familar.

1. ______________________________

____

____

____

Summary [key word or phrase]: ______________________________

2. ______________________________

____

____

____

Summary [key word or phrase]: ______________________________

3. ______________________________

____

____

____

Summary [key word or phrase]: ______________________________

OVER PLEASE

Appendix K [cont.]

THESIS COMPONENT

This component refers to the thesis [written document] prepared by the doctoral student. It incorporates the **scope** of the thesis, the **intent** of the thesis, and **all other aspects** of doctoral theses [e.g., contribution the thesis should make, length of thesis, options in lieu of thesis, supervision by faculty, time to complete, etc.].

Please define the three issues which you believe are, or may be, the most problematic with respect to the thesis component of the Ph.D. [or D.Phil.] degree with which you are most familiar.

1. ______________________________

____

____

____

Summary [key word or phrase]: ______________________________

2. ______________________________

____

____

____

Summary [key word or phrase]: ______________________________

3. ______________________________

____

____

____

Summary [key word or phrase]: ______________________________

THANK YOU

Appendix L: Round 2 questionnaire

CONFIDENTIAL

Code Number: ________

Date Mailed: ________

INTERNATIONAL RESEARCH ON THE DEGREE PHILOSOPHIAE DOCTOR

Your kind assistance, which will enable me to complete my doctoral degree, is gratefully appreciated. Keith Allan Noble

This questionnaire is round 2 of the study. It is based on problematic **issues identified in round 1** by international panel members. Questions 1-16 were developed from issues raised in a minimum of two of the countries [Australia, Canada, Great Britain, United States] represented in the study, and questions 17 and 18 were developed from issues raised in one.

Please interpret all questions in relation to the Ph.D. [or D.Phil.] degree with which you are most familar. And note that thesis and dissertation are considered **synonymous** in this research.

The seven-point scale used in this questionnaire is defined as follows:

neg						**pos**
1	2	3	4	5	6	7
o	o	o	o	o	o	o
strong negative effect	moderate negative effect	weak negative effect	no effect	weak positive effect	moderate positive effect	strong positive effect

Please respond to each question by **shading the circle** below the number which you select as your answer [e.g., ●].

As this is a **short** questionnaire which only requires quantitative answers, please complete and return it **within one week after receipt**, or as soon as possible thereafter. Thank you. An addressed return envelope is provided for your use.

After all of the completed questionnaires are returned, a summary of the answers will be forwarded [Round 3] to you for **your reconsideration**. Your summary will include the panel's median response, the panel's interquartile range, and your response.

An **overall summary of the findings will be forwarded to all participants** after the collection of data is completed.

OVER PLEASE

Appendix L [cont.]

What effect will the action, described in each of the following statements, most likely have on the Ph.D. [or D.Phil.] degree?

	neg	1	2	3	4	5	6	7	pos
1. Insisting the priority of doctoral research is to add to knowledge [i.e., original contribution]		○	○	○	○	○	○	○	
2. Insisting the priority of doctoral research is to enhance learning [i.e., research training]		○	○	○	○	○	○	○	
3. Insisting that doctoral research be "basic" or "pure," not "applied" or "practical"		○	○	○	○	○	○	○	
4. Improving the advising, directing, or supervising of doctoral students		○	○	○	○	○	○	○	
5. Requiring doctoral students acquire writing skills before they write their theses		○	○	○	○	○	○	○	
6. Defining the reason for, the extent of, and the method of mandatory study		○	○	○	○	○	○	○	
7. Clarifying the standards for preparing and evaluating the doctoral thesis		○	○	○	○	○	○	○	
8. Decreasing the time allowed to write the thesis		○	○	○	○	○	○	○	
9. Approving alternatives to the traditional thesis [e.g., a book or journal articles]		○	○	○	○	○	○	○	

OVER PLEASE

Appendix L [cont.]

What effect will the action, described in each of the following statements, most likely have on the Ph.D. [or D.Phil.] degree?

	neg	1	2	3	4	5	6	7	pos
10. Increasing the emphasis placed on the study of research methods		○	○	○	○	○	○	○	
11. Permitting and facilitating the attainment of all components of the degree by part-time students		○	○	○	○	○	○	○	
12. Ensuring all doctoral students receive a stipend and/or funds to conduct their research		○	○	○	○	○	○	○	
13. Requiring the written thesis be shorter than the existing norm [i.e., fewer pages]		○	○	○	○	○	○	○	
14. Decreasing the time allowed to complete all components of the degree		○	○	○	○	○	○	○	
15. Accepting "creative" approaches to research [i.e., novel in lieu of traditional approaches]		○	○	○	○	○	○	○	
16. Approving interdisciplinary study		○	○	○	○	○	○	○	
17. Incorporating teacher training into the degree [i.e., teaching doctoral students how to teach]		○	○	○	○	○	○	○	
18. Approving group or team research [i.e., thesis research conducted by more than one student]		○	○	○	○	○	○	○	

THANK YOU

Appendix M: Round 3 questionnaire

CONFIDENTIAL

Code Number: ________   Date Mailed: ________

INTERNATIONAL RESEARCH ON THE DEGREE PHILOSOPHIAE DOCTOR

Your kind assistance, which will enable me to complete my doctoral degree, is gratefully appreciated. Keith Allan Noble

This **summary** questionnaire is Round 3 of the study. It is based on problematic issues related to the Ph.D. degree identified [Round 1] and assessed [Round 2] by international panel members.

All of the responses, for each question, recorded by panel members have been summarized. An example of the format and an explanation of the **summary statistics** are provided on the next page.

Please reconsider all of your previous responses in light of the panel's responses. **Answer each question again by shading the circle** below the number which you select as your response [e.g., ●].

Your responses may or may not change. Do not feel you must change your responses to conform with the panel's responses. The intent of this reconsideration process is **not to force a consensus** among panel members. Rather, it is to arrive at a stable response, for each question, by the panel as a whole.

Please interpret all questions in relation to the Ph.D. [or D.Phil.] degree with which you are most familar. And note that thesis and dissertation are considered **synonymous** in this research.

As this is a **short** questionnaire which only requires quantitative responses, please complete and return it **within one week after receipt**, or as soon as possible thereafter. Thank you. An addressed return envelope is provided for your use.

After all of the completed questionnaires are returned a summary of the responses **may be forwarded** [Round 4] to you for further reconsideration. This action will depend on the stability of the panel's responses to Round 3 in relation to Round 2. The summary would include the panel's median response, the panel's interquartile range, and your response.

An **overall summary of the findings will be forwarded to all participants** after the collection of data is completed.

OVER PLEASE

APPENDIX M [cont.]

The seven-point scale used in this questionnaire is defined as follows:

neg			.	.	M	.	. pos
	1	2	3	4	(5	6)	7
	|	|	|	Y	|	|	|
	o	o	o	o	o	o	o
	strong negative effect	moderate negative effect	weak negative effect	no effect	weak positive effect	moderate positive effect	strong positive effect

Summary Statistics

. a dot over the number indicates that at least one member of the panel recorded that number as a response in Round 2;

M the median, of the panel's responses in Round 2, is indicated by the letter M over the median number;

() the interquartile range of 25% [approx.] to 75% [approx.], of the panel's responses in Round 2, is indicated by parentheses around the numbers;

Y your response in Round 2 is indicated by the letter Y below the number which you selected [please note that if no Y is present it indicates you refrained from responding to the question in Round 2].

OVER PLEASE

Appendix M [cont.]

What effect will the action, described in each of the following statements, most likely have on the Ph.D. [or D.Phil.] degree?

1. Insisting the priority of doctoral research is to add to knowledge [i.e., original contribution]

neg	.	.	.	.	.	M	.	pos
	1	2	3	(4	5	6)	7	
	○	○	○	○	○	○	○	

2. Insisting the priority of doctoral research is to enhance learning [i.e., research training]

neg	.	.	.	.	M	.	.	pos
	1	2	(3	4	5	6)	7	
	○	○	○	○	○	○	○	

3. Insisting that doctoral research be "basic" or "pure," not "applied" or "practical"

neg	.	M	.	.	.	.	.	pos
	1	(2	3)	4	5	6	7	
	○	○	○	○	○	○	○	

4. Improving the advising, directing, or supervising of doctoral students

neg					.	.	M	pos
	1	2	3	4	5	(6	7)	
	○	○	○	○	○	○	○	

5. Requiring all doctoral students acquire writing skills before they write their theses

neg		.	.	.	.	M	.	pos
	1	2	3	4	(5	6)	7	
	○	○	○	○	○	○	○	

6. Defining the reason for, the extent of, and the method of mandatory/required study/courses

neg			.	.	M	.	.	pos
	1	2	3	(4	5	6)	7	
	○	○	○	○	○	○	○	

7. Clarifying the standards for preparing and evaluating the doctoral thesis

neg			.	.	.	M	.	pos
	1	2	3	4	(5	6)	7	
	○	○	○	○	○	○	○	

8. Decreasing the time allowed to write the thesis

neg	.	.	.	M	.	.	.	pos
	1	2	(3	4)	5	6	7	
	○	○	○	○	○	○	○	

9. Approving alternatives to the traditional thesis [e.g., a book or journal articles]

neg	.	.	.	M	.	.	.	pos
	1	2	(3	4	5)	6	7	
	○	○	○	○	○	○	○	

OVER PLEASE

APPENDIX M [cont.]

What effect will the action, described in each of the following statements, most likely have on the Ph.D. [or D.Phil.] degree?

10. Increasing the emphasis placed on the study of research methods

neg		.	.	.	M	.	.	pos
	1	2	3	(4	5	6)	7	
	○	○	○	○	○	○	○	

11. Permitting and facilitating the attainment of all components of the degree by part-time students

neg	.	.	.	.	M	.	.	pos
	1	2	3	(4	5	6)	7	
	○	○	○	○	○	○	○	

12. Ensuring all doctoral students receive a stipend and/or funds to conduct their research

neg		.	.	.	.	M	.	pos
	1	2	3	4	(5	6)	7	
	○	○	○	○	○	○	○	

13. Requiring the written thesis be shorter than the existing norm [i.e., fewer pages]

neg	.	.	.	M	.	.	.	pos
	1	2	(3	4	5)	6	7	
	○	○	○	○	○	○	○	

14. Decreasing the time allowed to complete all components of the degree

neg	.	.	.	M	.	.	.	pos
	1	2	(3	4	5)	6	7	
	○	○	○	○	○	○	○	

15. Accepting "creative" approaches to research [i.e., novel in lieu of traditional approaches]

neg	.	.	.	.	M	.	.	pos
	1	2	3	(4	5)	6	7	
	○	○	○	○	○	○	○	

16. Approving interdisciplinary study

neg		.	.	.	.	M	.	pos
	1	2	3	4	(5	6)	7	
	○	○	○	○	○	○	○	

17. Incorporating teacher training into the degree [i.e., teaching doctoral students how to teach]

neg	.	.	.	.	M	.	.	pos
	1	2	3	(4	5)	6	7	
	○	○	○	○	○	○	○	

18. Approving group or team research [i.e., thesis research conducted by more than one student]

neg	.	.	.	M	.	.	.	pos
	1	2	(3	4	5)	6	7	
	○	○	○	○	○	○	○	

THANK YOU

Appendix N: Round 1 problematic issues*

AUSTRALIA

1. "The number of courses prior to beginning the thesis.
2. Whether there should be a Ph.D., or similar degree, which is entirely by course work.
3. Whether it is possible to complete part or all of the degree by correspondence study.

4. The degree to which the thesis attempts to investigate a significant issue, as opposed to an issue which is do-able in the time available.
5. The degree to which the student is involved in a team effort, i.e., cooperative research.
6. The scope of the different types of theses which are acceptable.

7. The amount of supervision offered at each stage in the development of the thesis.
8. The degree of specificity, completeness, of the thesis proposal.
9. The minimum and maximum time allowed for the thesis to be completed."

10. "There is no prescribed study for most Ph.D. candidates in Australian universities. Where coursework has been proposed as a required element, it has been attacked as lowering the standard of the degree which is a research degree.
11. Many students would benefit from structured and coherent instruction in research methods, but such instruction is almost never offered, much less required.
12. Students attempting Ph.D.s in areas of study which do not have a research tradition [law, computer science] or in interdisciplinary areas [women's studies, aboriginal studies] should not be expected to earn a degree by research only. They need the support and interaction coursework can provide.

13. There is a serious conflict between the two major views of the Ph.D.: 1) that it provides training in research with a view to producing an independent researcher; 2) that the student must make a substantial and original contribution to knowledge.
14. Supervisors and students fail to define sensible and manageable projects which can be completed within minimum enrolment periods.
15. Supervisors all to often allow students to drift along without producing results at regular intervals, and then wonder why students don't complete theses on time [or at all].

16. Standards by which theses are to be judged are incredibly vague. Criteria for evaluation are virtually nonexistent.
17. Theses extending to more than one volume, or well over 500 pages, are all too common.
18. Too little emphasis is placed on editing the thesis to produce coherent and well-structured scholarly writing." **[cont.]**

Appendix N [cont.]

19. "Amount of study necessary before starting a thesis or research component; how much independent study is required for a Ph.D..
20. Tension between study component as an induction into an existing body of knowledge versus opening up new areas.
21. Need for courses which are a suitable pre-requisite to independent study versus fitting into existing masters programs. This is particularly difficult for schools with small numbers of students.

22. Ensuring that completion times/rates are not excessive, i.e., student continues far beyond maximum.
23. Relationships between student and advisor; personal mentoring versus getting a product.

24. Appropriateness of standard form of thesis and the fact that they cannot be published without substantial changes in form.
25. Ensuring that maximum length guidelines are adhered to.
26. Ensuring that theses are theses, not just accounts of research completed."

CANADA

27. "The conflict between courses that provide information about administration [generic sense] and courses that are specialised in nature. Our Ph.D. degree is a degree in administration but students belong to departments.
28. Lack of general agreement among professors as to what constitutes core knowledge either in administration generally or in the specialised disciplines.
29. Unwillingness of professors to work pedagogically with students, or to mount Ph.D. level courses because of lack of perceived rewards.

30. Different perceptions among faculty as to what is suitable doctoral research.
31. Conflict between quantitative types and qualitative types. Rigor versus relevance issue.
32. Financial support for doctoral students.

33. Putting together a committee of four professors who may each have different notions of what constitutes a thesis.
34. Dealing with students who may be writing a thesis while being employed elsewhere - they are slow. Supervisors leave and they must start all over again.
35. Applied versus theoretical thesis."

[cont.]

Appendix N [cont.]

36. "The purpose of a Ph.D. may be most problematic, especially for people in a professional field like educational administration. Clarifying its purpose in the minds of students and faculty, is essential.
37. Content of the course work should be tailored to individual's background - gaps in domains of knowledge and experience. Emphasis on understanding ways of thinking should be given priority.
38. Opportunities to have one's ideas, and to develop the capacity to use criticism constructively is often best found during seminar-type discussions. Keen fellow students and faculty are needed.

39. Research study and completion through to publication is essential part of Ph.D. program. I would not substitute anything else for it.
40. Many candidates are unable to put their own work into some kind of context when discussing their findings. We in the universities should devise ways of preparing them better to do that.
41. The conceptual framework devised by the researcher or adopted for the purpose of the study, is probably the most important part of the whole undertaking.

42. Whether the thesis becomes a book publication or not, it should be of a standard that it should meet such requirements. The student should expect such an outcome and the program should include an introduction to ways of becoming a published author.
43. A thesis may take different forms of publication - video or computer program, or disc, but it should be in a form that can be explained, justified, defended, and contributes to knowledge.
44. Ability to communicate one's ideas in written form, or some other form which can be shared with others, is essential."

45. "Students apply to the Ph.D. and Ed.D. programs with a variety of M.A.s not necessarily in education. The university persists in regarding them as having 'transferred field' and requires about four extra preliminary courses - even though their interest and their M.A. is excellent and adequate background.
46. The Ph.D. requires two consecutive academic years of residence [full-time study], the Ed.D. one. It should be possible to a) start the Ph.D. course work part-time [as in the Ed.D.] and b) to break up the residence years allowing for return to work. Most doctoral candidates these days are not 22 year old youngsters.
47. Both doctorates' full-time work permission is predicted on a university-type academic work load, unrealistic for candidates who have other jobs, and that's increasingly common. It's defined as maximum 10 hours. It could be 10 hours of teaching and permissible!. A student could be the mother of 10 school-aged children and be considered unemployed.

[cont.]

Appendix N [cont.]

48. Difficulty of access to [illegible word here] and subjects. My students often wish to study the university itself [illegible word here] institutions, look at their records and policies. For are institutions committed to *doing* research, the members are strangely cosy.
49. Cost. Too many theses are carried out with very small [illegible word here] because of time and dollar costs. Postage, telephone, travel, printing of flyers, etc., commuting runs to over $2,000-$3,000. Not all students have SSHRC grants. The research is adequate but has to be characterized as an 'introductory pilot' or 'case study.'
50. I think research *originality* must be stressed. I do not agree with theses which merely synthesize known literature. I think *time* is essential. I assume research training will be adequate and required. What is needed is *honest* counselling of candidates so they know the whole program will probably take five years beyond masters.

51. The problem of getting students to define a researchable question *before* approval is given for them to begin work is not generally faced by faculty. Too often the weaknesses emerge after the thesis work has begun.
52. Faculty, for the most part, have never been taught to direct someone else's research. They are too 'approving' don't offer enough direction. They are vague and general in their responses instead of being *specific* and *prescriptive*.
53. Faculty are lazy - too slow in their response time and apt to wait for the student to come with a problem instead of periodically *requiring* face to face progress reports."

54. "Not enough course work on methodology. Recipients become totally dependent on technicians for selection of research instruments.
55. Many thesis directors are simply not qualified to direct because they have received no methodology and have no non-academic experience.
56. Can one get a Ph.D. in anything and nothing.

57. In many fields theses are endless stacks of paper which could be summarized in a few pages.
58. In professional areas there should be more practicum associated with the Ph.D. requirements.
59. Too many theses conclude with 'more research is needed.' Doesn't that make one wonder?

60. Too long in many fields.
61. Some faculty are not qualified.
62. Some universities take pride in keeping their Ph.D. students 7-9 years. This is objectionable.

[cont.]

Appendix N [cont.]

63. A thesis is a large book. It's usually the first one a student has written entirely on his/her own. I find students cannot write with precision for the accurate transfer of information and ideas. Their language is sloppy and their vocabulary cliché ridden. Quite quickly by tearing apart their first chapter almost line by line and editing it you can make them very language conscious and improve their writing."

64. "The number of courses required in experimental medicine at [name of university deleted] interferes, especially in the first year, with the students' research.
65. At [name of university deleted] there is a necessity of having 18 course credits in experimental medicine. This seems to be rather rigid.
66. Many of my students are foreign and do not have a good grasp of English. Consequently, they may do poorly in their course work because of their inability to express themselves well. In the laboratory, their ability does not prevent conceptualization or performance.

67. A major problem for any graduate student is finding personal financial support. The amount of loans available for graduate students is inadequate.
68. Students do not seem to know the literature related to their research as well as I would expect during the time of doing their bench work.
69. Learning how to design experiments and use appropriate controls to validate and answer the questions posed.

70. Students often spend 6-7 months in the laboratory writing their thesis. An inordinate amount of time is spent writing their thesis. If theses were limited to not more than 100 pages, mandatory presentations of research on a yearly basis, and a vigorous defense would give similar end results.
71. Many theses are unnecessarily long and incorporate a great deal of irrelevant data. Introductions are especially long.
72. Students need practice writing. A better option might be yearly short written reports 15-20 pages and presentations to department and outside department members."

73. "Availability of courses - some courses are offered in alternate years or at a time which conflicts with another course.
74. Relevance of course work to the proposed research topic. Sometimes courses do not seem to be of any use to the proposed research.
75. Credit for courses taken by independent study or on a distance education basis. To give credit for such work how do you assess the quality and ensure the student has access to library resources.

[cont.]

Appendix N [cont.]

76. Lack of financial support for research constrains the amount and kind of research which can be done.
77. Relevance of the proposed research or benefit to the community outside the academic environment. Particularly true for international students.
78. Availability of financial assistance for the student - some students cannot afford to go to a doctoral program because of lack of personal finances.

79. Quality of thesis supervision. How does a student select a good supervisor?
80. Variation in expectations and standards between departments or institutions.
81. Options in lieu of a thesis - published papers and/or a thesis. Suitable for some disciplines but not all. How do you know who did the work."

82. "The difficulty of having courses from other disciplines recognized as part of the course of study.
83. Lack of opportunity to take courses part-time.
84. Lack of good teaching.

85. Difficulties in doing interdisciplinary research.
86. Financial support.
87. Lack of advice or supervision.

88. Inadequate supervision.
89. In general I was satisfied with my experience as a student at the doctoral level. I had some difficulties in getting my supervisor to read completed chapters within a reasonable time period."

90. "Length of time taken to complete requirements.
91. Required courses - fitting them in, integrating them with others, leaving enough time for individually tailored course work.
92. Formal vs. informal opportunities for study - the importance of learning from peers and interacting informally in a graduate student subculture.

93. Balancing interest in the subject matter with relevance to both the discipline and life itself.
94. Limiting the scope of the topic, i.e., making a realistic assessment of what can be done in the course of one research project.
95. Getting good advice and guidance from a supervisor, both with respect to [panelist refers to the issues numbered 124 and 125] and on a contextual basis as the research develops.

[cont.]

Appendix N [cont.]

96. The amount of time taken to finish it - it should not be allowed to become a life's work. Although difficult to grasp at the time, this needs to be kept in perspective. Flexibility, however, for those engaged in other activities while writing, e.g., working, bearing or raising children.
97. The length of the thesis - for much the same reason as [panelist refers to issue number 127]. Good advising here could assist in keeping this under control.
98. Departmental and university rules should not be allowed which turn back a thesis for anything other than minor changes. Students should not be allowed to proceed to the point of starting a thesis or be allowed to engage in all the research and writing involved and then be turned back. Thesis defense should not be an opportunity to 'weed out' students."

99. "Length of time required to complete the study portion. Ph.D. program has been and will continue to be problematic. Amount of study is directly related to this time. Full-time study can be especially difficult. What is needed is a 'defined number of courses' - when necessary - and flexibility in time arrangements - length and when done.
100. The method of study - formal classroom setting versus readings or ... needs to be explained. Each method is valid. Approach may be related primarily to the focus of the doctorate, its nature, the students' preferences and so on.
101. What is an appropriate background for study at the doctoral level? What constitutes an appropriate doctoral thesis? These questions must be explored and the responses need to be more clearly articulated than they are now - at least in most instances.

102. Is the purpose of the research clear - in terms of the student's further needs in his/her doctoral program? Is the research intended primarily for the student's academic and professional growth?
103. Will the research emphasize the student's academic and/or professional needs? Must the research be supervised by one or more individuals?
104. What is appropriate research in terms of the student's eventual goal - which could be to successfully complete a Ph.D. which will improve his skills knowledge level.

105. The scope of a thesis - because its breadth often varies from one advisor to the next needs to be better understood. How much 'depth' must it contain?
106. The intent should be originality and/or new insights/knowledge - when possible. Confirmation may be sufficient in certain cases.
107. There should be options in lieu of a thesis - supervised practicum. Publication of a book should be an accepted substitute - with certain conditions."

[cont.]

Appendix N [cont.]

GREAT BRITAIN

108. "Having to spend time on topics with which they are already familar, e.g., statistics, methodology.
109. Having to spend time on topics which are perceived as irrelevant to what they want to do.

110. Feeling that nobody is interested in what they are doing. Being isolated from others pursuing research objectives.
111. Difficulties in determining what is required, e.g., what are the definitions of quality? originality?.
112. Difficulties in pacing work: organizing, planning, managing research.

113. Actually writing it.
114. Getting the correct balance of theoretical underpinning to pragmatic findings/empirical evidence.
115. Being able to select what to put in it and what to leave out - students usually want to write 3 or 4 times more than is necessary because they are unable to reject anything that they have done during the course of their work."

116. "Lack of a sufficiently clear profile of each candidate's research training needs, so that prescribed courses [where there are any] tend not to fit the needs of individual candidates.
117. Staff/faculty lacking in understanding of the study needs of candidates, and therefore not providing good courses for them.
118. Considerable differences in the interpretation of Ph.D. requirements, so that for some subjects there is a clear study component [and an emphasis on cooperative research] while for others the candidate is left to obtain study help on his own initiative.

119. Excessive stress on originality leading to work on subjects of no real interests, just because no one has done them before.
120. Ill-defined relations with the 'real world': Institutions differ greatly in their willingness to accept research experience gained in the course of employment.
121. Too much stress on what will [supposedly] please the examiner, as against making a contribution to a wider scholarly or practical community.

[cont.]

Appendix N [cont.]

122. Tendency to write, at excessive length, in a pretentious jargon. Insufficient stress on communicating ideas in an economic and effective way.
123. Lack of guidance about time required for thesis writing, leading to great delays in final submission.
124. Inadequate skills in presenting background material effectively, without giving an excessive number of useless references [to show how clever you are!]."

125. "The component is usually too small and minor in UK universities.
126. The relevance of the courses to the work of the student must exist and must be sold to him.
127. The component gives an opportunity for brilliant lectures that is only rarely used to the full.

128. Choice of too difficult a topic makes students take too long [3 years should be the maximum].
129. Topic may be controversial but should be of interest to others in the field.

130. An excellent opportunity to improve the student's ability to communicate. Too rarely used for this purpose.
131. Student not aware of how long good writing takes, nor how demanding a task it is.
132. Student not sufficiently prepared to write well."

133. "The identification of 'the problem' to be investigated. This requires that the technical problem to be studied is operationalised in a way which can be repeated by subsequent researchers. How do problems arise?. Dewey would say as a result of a sudden unexpected change. This enables the problem to be operationalised.
134. To adopt and thoroughly understand the research methodology appropriate to an investigation of the problem. There are several from which to choose, it is necessary for a doctoral student to have a sound theoretical knowledge of the APPROPRIATE research technique.
135. Formulation of hypotheses to be tested. These can be regarded as tentative solutions to the problem to be studied. Whether the intention is to confirm or refute the proposed solution will depend on the epistemological assumptions accepted.

[cont.]

Appendix N [cont.]

136. The purpose of the research depends on whether it is regarded as 'applied' or 'pure' research. If the former, the intention should be to assess the appropriateness of an accepted solution to the conditions under which it is to be applied. The purpose of 'pure' research is to descriminate between hypothetical solutions with the intention of eliminating those which will not work. In other words the purpose can be an overtly 'practical' or 'theoretical' understanding.
137. According to the purpose of the study and the epistemology adopted, the refutation of proposed solutions or the confirmation of stated hypotheses. This problematic bears on the audience, e.g., business, public authorities, etc., to whom the research is addressed. Few public bodies want researchers to demonstrate that their policies will not work. Consequently, if the research is designed to help [or is financed by] industry/public authorities choice of emphasis is important.
138. From my perspective it is imperative to identify the SPECIFIC CONDITIONS under which a solution is to be implemented. This is more difficult to realise, other than by using inadequate factorial analysis methods. The identification and weighting of the contextual variables is highly problematic."

UNITED STATES

139. "Curriculum design: The curriculim quite often seems to be determined by the personal interest of the faculty in the department, rather than the evaluation of skills that need to be acquired for professional success. Results: take unnecessary courses.
140. Lack or insufficient practica: A higher percentage of courses in the doctoral program seem to be theoretical, rather than applications of knowledge to real settings.
141. Requirements like competency exams and review papers are often quite [illegible word here]. Neither the faculty nor the students know what to do about it.

142. Define a research topic. Most faculty have difficulty coming up with a worthwhile research topic, and they expect inexperienced researchers to be able to define a better research than they themselves could do.
143. Make an original contribution. This tradition of research as a 'new [illegible word here] in the ever growing temple of knowledge' doesn't help much. Research project should attempt to solve practical problems, and this might involve replication studies.
144. Human subjects or animal subjects rights committees. Today the research are stopped or delayed for unreasonable requests from human and animal subjects rights committees. They sometimes seem to have lost sight of what research are all about.

[cont.]

Appendix N [cont.]

145. Supervision by faculty: Supervisors give too much freedom to the students, because it takes too much time for them to supervise research.
146. Write the final thesis. A difficult task that requires many rewritings. Because of usual lack of supervision, this becomes a serious problem at the time of writing the doctoral thesis.
147. Disagreement over thesis requirements between faculty. Departmental faculty should define what is a good thesis and agree on thesis requirements. Quite often, the student's thesis becomes the excuse for methodological and technical arguments between faculty. This often results in increasing time to graduation."

148. "Insufficient interdisciplinary emphasis.
149. Although not always applicable, Ph.D. study programs generally take too little account of the needs of those who will pursue teaching careers, especially those who will be teaching undergraduate students.
150. Insufficient attention to the history and methodology of the discipline.

151. Too much stress on individual research, too little provision for team research, especially in humanities and social sciences.
152. Too little use of foreign languages as research tools.

153. Topic too often too narrow because of stress upon making original contribution to scholarship.
154. Stress upon single product. Why not a series of essays, experiments?
155. Too much stress upon originality, too little attention to the training and educational value of doing thesis."

156. "Should students in U.S. history be required to have skills in such traditional languages as French and German? Can he/she substitute a discipline such as statistics? How many languages should those in ancient history be required to have? [Greek, Latin, Herbrew, others?]
157. Should doctoral students have an acquaintance with various philosophies of history, e.g., Marxism? How large a component of required courses should be in Historiography and/or Intellectual History? Should we have other requirements than these oriented about regions and eras?
158. How concentrated or diverse should the candidate's fields be? A major field and a minor field would concentrate the candidate's efforts upon the areas of his dissertation. On the other hand, competency in a broad range of fields [3-4], would make the candidate more marketable, especially for jobs in small colleges.

[cont.]

Appendix N [cont.]

159. How much of a stipend should be given? What duties should be required? Is it reasonable to ask a Teaching Fellow to teach two sections of a survey course? How many years support should a student be given? Is 3 years too short a period of time?
160. Should a student be restricted to materials which are available to him locally? If he has to use interlibrary services, should there be a limit to his use of these? What support should the university give to its graduate programs in terms of its library resources?
161. Should a student be assisted in his travels to visit repositories of documents? What about travel abroad? Should a student be aided to attend a conference, when he reads a paper? What if he/she simply attends?

162. What efforts should be made to ensure that the topic of the thesis falls within the competence of the thesis advisor? If he or she is not fully confident, should an outside advisor be invited to participate. If so, at what kind of compensation?
163. What role should be played by the other readers of the dissertation? Should the student give first drafts to them chapter by chapter, or only drafts revised in the light of the advisor's comments? Should the other readers' comments be limited to coherence rather than content?
164. What should be the length of time permitted for the completion of a dissertation? Should there be a limit placed on the length of the dissertation? Should the student strive to produce a publishable work?"

165. "Relevant courses - Very often doctoral students are advised to take courses that have little or no significance in impacting their present or future endeavors. Course work should be selected and developed with the intent of helping students understand research and the importance of qualitative and quantitative thinking.
166. Number of courses - The number of courses or semester/quarter credits that one takes toward partially fulfilling requirements for the Ph.D. should vary according to the determined academic preparation of students. Nevertheless, it must be remembered that the Ph.D. is a research focused degree and not designed for an abundance of course work.
167. Seminars - Some structured course work [i.e., regular classroom teaching] is necessary. However, seminars are very important in developing qualitative thinking skills of students. Increasingly, participatory seminars [student presentations] should be incorporated in the Ph.D. program.

[cont.]

168. Purpose of research - The original intents of performing research for the Ph.D. degree was to sharpen the minds, develop students with sophisticated, highly trained, and heightened intellectual skills. The focus continues today. However, the search for specific answers to problems has led to the development of dishonesty in researchers. The end point of research for the Ph.D. in science, engineering, and mathematics is too narrowly focused.
169. Emphasis of research - It is my opinion that too little emphasis is placed on research. The Ph.D. degree has moved more toward course requirements.
170. Financial assistance - In most cases doctoral students are not adequately compensated for the jobs done for the various universities and colleges. Doctoral students serve as teaching assistants or research assistants. They are employed on a half-time basis [20 work hours/week]. This time contracted is theoretical and far less time than that required for the job."

171. "A full-time residency requirement.
172. An emphasis on the relationship of theory to practice.
173. Acceptance of doctoral degree within the university community.

174. Basic versus applied research.
175. Funding for research.
176. Nature of research for part-time students.

177. Thesis structure to fit the research rather than a prescribed chapter outline.
178. Publication of a book or monograph in lieu of a thesis.
179. For certain research topics, a writing style for those who can use the results."

180. "Courses may repeat material which has been covered in previous work [at other universities or in the same one].
181. There is rarely a true attempt to integrate courses. This results in a 'string of pearls' program.
182. Many courses are taught in a traditional mode, not focusing [or allowing] the student to use creativity and/or thinking skills.

183. Not enough research other than the thesis is required. The student winds up doing a dissertation as his/her first piece of research.
184. Research that is done is most often designed by a supervisor. The student is rarely required to be original.
185. Research is often quite narrow in focus, hence unrelated to the overall program.

[cont.]

Appendix N [cont.]

186. The thesis is usually treated as a solitary activity, as opposed to 'real world' research which is typically collaborative.
187. Since this is often the first piece of research completed by the student, an expectation of originality and importance is somewhat unresonable.
188. There is a ticklish balance between quality and completion. The thesis becomes the 'last hoop' and research suffers."

189. "Course requirements - should all doctoral candidates be required to complete certain basic methodological/pedagogical courses as point of departure for later specialized study?
190. Should graduate seminars, esp. those purporting to be 'surveys' enabling candidates to gain advanced comprehension of entire subject areas [e.g., literary eras] incorporate the seminar professor's personal 'special topic' preference as its focus? It may contradict the purpose.
191. Should all graduate programs in the same field require a certain number of courses before students proceed to thesis research? [How shall candidates demonstrate readiness for the research?].

192. How shall candidates be held accountable during research phase? Do guidelines need to be enacted for advisors and their students to discuss /ensure validity, thoroughness, originality, significance of research?
193. Where will money come from to support students doing research?

194. Should relations between advisor[s] and thesis writer be more structured. Should more be done about articulating to the writer the form and style peculiar to theses [i.e., stylistic/formal instruction].
195. Is original scholarship a must? Or would it suffice to let the thesis demonstrate competent relations between discrete ideas and collected information?
196. Does a prescribed length only encourage irrelevance and bloated organization?"

197. "Should graduate students be exposed to formal experiences [courses, seminars, etc.] dealing with ethics and nature of research?
198. Should graduate students be exposed to formal experiences dealing with teaching in their disciplines and in higher education?
199. Should graduate students have to 'minor' in a subject related to their 'major?'

200. Too much emphasis on applied versus basic. Increasing pressure to do developmental projects. Emphasis on short term goals [although not necessarily on short time to degree].
201. Most research by graduate students is on projects obtained by their advisors. Originality of concept is not often encountered.
202. Group or teaching research brings into question the idea of independent investigation. **[cont.]**

Appendix N [cont.]

203. Do dissertations serve as scholarly resources or are they anachronisms?
204. Is the preparation of a dissertation a waste of time in fields where publication is in the form of short articles?
205. Do faculty advisors exert enough influence in limiting the scope of the dissertation so that it is realistic?"

206. "Often, courses are offered at the faculty member's rather than the student's convenience, required courses are offered infrequently, key courses are scheduled in conflict with other heavily subscribed courses, required prerequisites cause sequencing problems, etc..
207. The proper balance in the course work phase between breadth and depth can be difficult to achieve. Certainly, a doctorally prepared scholar should be a specialist, but he or she should also possess substantial knowledge of a general sort in his/her field.
208. Course requirements should not be so onerous that they impede unreasonably the student's progress in taking exams, satisfying language or skill requirements, conducting research, and writing the dissertation. The research sets the Ph.D. apart from other types of doctoral degree programs.

209. There are those studies which seem to be of limited significance. the research should constitute a useful contribution to the body of knowledge in the field of study. Studies that follow should be able to build on the findings of the research.
210. The novelty of the research is an important factor. Much research is not on the 'cutting edge.' Many studies deal with familiar topics with only slight variations or modifications to distinguish them from earlier studies.
211. Research is expensive. Doctoral students often are of modest means. Institutional and/or external support is helpful but often inadequate.

212. Many doctoral students do not sufficiently define and limit the parameters of the study. As a consequence, coherence and internal organization suffer and the dissertation lacks focus.
213. Many doctoral students have not learned to write cogently and succinctly. Many have the idea that the doctoral dissertation has to be lengthy. Simple statements are more effective than convoluted sentences.
214. Many students prolong the process unnecessarily because of an overwhelming concern about perfection. Often, faculty advisors on a student's committee are not in agreement about necessary editorial and organizational changes."

[cont.]

Appendix N [cont.]

215. "Achievement of breadth in the field of the Ph.D. - learning both the field, its development as an academic discipline and the methodologies and critical frameworks for the field.
216. Achievement of knowledge related to the field of the Ph.D. [historians need lit. and philos. as well as polit. sci.]. Political scientists need history, lit., phylos., etc..
217. Achievement of knowledge in the pedagogies of the discipline. How is this knowledge imparted to different learners etc..

218. Reading before the dissertation topic designed to develop a grasp of the major issues bearing on the subject.
219. Insistence by research advisors on the significance of the topic to the discipline.
220. Exposure to range of research methods and their relationships to outcomes and the politics of the discipline.

221. A thesis should continue to be a major piece of research notable for its depth and breadth of contribution to the field.
222. Its progress should be the ongoing serious concern of several faculty members who are publishing scholars.
223. Thesis should make a notable contribution to the individual and the discipline."

224. "Achieving breadth as well as depth in preparation for thesis and for future research.
225. Keep study within reasonable time limit.
226. Poor preparation - too many basics [including languages] covered during graduate work.

227. Available financial support controls area of research.
228. Areas of research too closely tied to advisors research because of funding situation.
229. Bias to 'large lab group' research in many fields.

230. Limit time of thesis research.
231. Scope of thesis - preparation for a career vs. magnus opus.
232. Acceptance of published material as part of thesis - question of authorship on such papers."

* The verbatim response of each panelist begins and ends with quotation marks. The problematic issues as they relate to the three fundamental components, lengthy study, original research, and thesis preparation in that order, are grouped and separated by a blank line. Not all panelists listed three problematic issues for each of the fundamental components; some panelists listed less, some listed more.

Appendix O: Round 1 single problematic issues*

CANADA

1. "Content of the course work should be tailored to individual's background - gaps in domains of knowledge and experience. Emphasis on understanding ways of thinking should be given priority."

2. "Credit for courses taken by independent study or on a distance education basis. To give credit for such work how do you assess the quality and ensure the student has access to library resources."

3. "Difficulty of access to [illegible word here] and subjects. My students often wish to study tne university itself [illegible word here] institutions, look at their records and policies. For are institutions committed to doing research, the members are strangely cosy."

4. "Formal vs. informal opportunities for study - the importance of learning from peers and interacting informally in a graduate student subculture."

5. "Many candidates are unable to put their own work into some kind of context when discussing their findings. We in the universities should devise ways of preparing them better to do that."

6. "Many of my students are foreign and do not have a good grasp of English. Consequently, they may do poorly in their course work because of their inability to express themselves well. In the laboratory, their ability does not prevent conceptualization or performance."

7. "Opportunity to have one's ideas and to develop the capacity to use criticism constructively is often best found during seminar-type discussions. Keen fellow students and faculty are needed."

8. "Students do not seem to know the literature related to their research as well as I would expect during the time of doing their bench work."

9. "The Ph.D. requires two consecutive academic years of residence [full-time study], the Ed.D. one. It should be possible to a) start the Ph.D. course work part-time [as in the Ed.D.] and b) to break up the residence years, allowing for return to work. Most doctoral candidates these days are not 22 year old youngsters."

GREAT BRITAIN

10. "Considerable differences in the interpretation of Ph.D. requirements, so that for some subjects there is a clear study component [and an emphasis on cooperative research] while for others the candidate is left to obtain study help on his own initiative." **[cont.]**

Appendix O [cont.]

11. "Difficulties in pacing work: organizing, planning, managing research."

12. "Feeling that nobody is interested in what they are doing. Being isolated from others pursuing research objectives."

13. "Ill-defined relations with the 'real world': Institutions differ greatly in their willingness to accept research experience gained in the course of employment."

UNITED STATES

14. "Acceptance of doctoral degree within the university community."

15. "Human subjects or animal subjects rights committees. Today the research are stopped or delayed for unreasonable requests from human and animal subjects rights committees. They sometimes seem to have lost sight of what research are all about."

16. "Reading before the dissertation topic designed to develop a grasp of the major issues bearing on the subject."

17. "Requirements like competency exams and review papers are often quite [illegible word here]. Neither the faculty nor the students know what to do about it."

18. "Seminars - some structured course work [i.e., regular classroom teaching] is necessary. However, seminars are very important in developing qualitative thinking skills of students. Increasingly, participatory seminars [student presentations] should be incorporated in the Ph.D. program."

19. "Should a student be restricted to materials which are available to him locally? If he has to use interlibrary services, should there be a limit to his use of these? What support should the university give to its graduate programs in terms of its library resources."

20. "Should graduate students be exposed to formal experiences [courses, seminars, etc.] dealing with ethics and nature of research."

21. "Should graduate students have to 'minor' in a subject related to their major?"

* The verbatim response of each panelist is listed by country. There were no single problematic issues from Australia.

Appendix P: Response summary for Rounds 2 and 3

		RATINGS								TOTAL*	
QU	ROUND	1	2	3	4	5	6	7		CHANGE	PANEL
1.	2	4	3	8	7	7	17	20			66
	3	2	2	9	4	10	22	17			63**
		2#	**1**	**1**	**3**	**3**	**5**	**3**	**+3##**	**21**	
2.	2	4	6	11	4	14	18	8			65
	3	3	3	11	6	14	21	7			62
		1	**3**	**0**	**2**	**0**	**3**	**1**	**+3**	**13**	
3.	2	14	25	13	3	6	4	1			66
	3	12	25	14	3	9	2	1			63
		2	**0**	**1**	**0**	**3**	**2**	**0**	**+3**	**11**	
4.	2	0	0	0	0	10	19	37			66
	3	0	0	0	0	5	22	39			63
		0	**0**	**0**	**0**	**5**	**3**	**2**	**+3**	**13**	
5.	2	0	2	2	5	18	23	16			66
	3	0	2	2	3	17	26	16			63
		0	**0**	**0**	**2**	**1**	**3**	**0**	**+3**	**9**	
6.	2	0	0	5	18	17	14	9			63
	3	0	1	2	17	16	18	9			60
		0	**1**	**3**	**1**	**1**	**4**	**0**	**+3**	**13**	
7.	2	0	0	3	5	20	22	15			65
	3	0	0	1	4	16	31	13			62
		0	**0**	**2**	**1**	**4**	**9**	**2**	**+3**	**21**	
8.	2	7	12	14	13	10	5	3			64
	3	4	10	16	17	9	5	3			61
		3	**2**	**2**	**4**	**1**	**0**	**0**	**+3**	**15**	
9.	2	8	16	6	10	8	14	4			66
	3	6	18	7	8	12	13	2			63
		2	**2**	**1**	**2**	**4**	**1**	**2**	**+3**	**17**	
10.	2	0	2	4	10	25	19	6			66
	3	0	1	1	12	23	23	6			63
		0	**1**	**3**	**2**	**2**	**4**	**0**	**+3**	**15**	
11.	2	3	7	6	10	14	16	10			66
	3	4	6	7	8	17	16	8			63
		1	**1**	**1**	**2**	**3**	**0**	**2**	**+3**	**13**	

[cont.]

Appendix P [cont.]

QU	ROUND	1	2	3	4	5	6	7		TOTAL CHANGE	PANEL
12.	2	0	1	1	9	14	21	19			65
	3	1	1	1	8	10	26	18			62
		1	**0**	**0**	**1**	**4**	**5**	**1**	+3	15	
13.	2	2	7	13	17	13	9	5			66
	3	3	7	10	22	12	9	3			63
		1	**0**	**3**	**5**	**1**	**0**	**2**	+3	15	
14.	2	7	7	17	13	14	3	4			65
	3	6	8	14	19	13	2	3			62
		1	**1**	**3**	**6**	**1**	**1**	**1**	+3	17	
15.	2	4	4	7	11	21	9	9			65
	3	4	6	9	10	16	14	6			62
		0	**2**	**2**	**1**	**5**	**5**	**3**	+3	21	
16.	2	0	1	1	11	13	21	19			66
	3	0	0	2	10	13	26	15			63
		0	**1**	**1**	**1**	**0**	**5**	**4**	+3	15	
17.	2	5	4	7	10	20	12	8			66
	3	6	3	4	13	21	12	7			63
		1	**1**	**3**	**3**	**1**	**0**	**1**	+3	13	
18.	2	9	10	8	5	20	12	2			66
	3	9	13	6	8	18	9	3			63
		0	**3**	**2**	**3**	**2**	**3**	**1**	+3	17	

* Total of units of change

** Round 3 panel reduced by three due to missing questionnaires

# Absolute difference in numbers of panelists selecting rating recorded as units of change

## Three units of change added because of 3 missing questionnaires

Appendix Q: Final prognoses of panel for all questions

	COMPONENT*			PROGNOSIS		
ISSUE**		QU	ACTION	-VE#	NE	+VE
1.	**R**	1.	Insisting the priority of doctoral research is to add to knowledge [i.e., original contribution].	20##	6	74
1.	**R**	2.	Insisting the priority of doctoral research is to enhance learning [i.e., research training].	26	9	65
1.	**R**	3.	Insisting that doctoral research be "basic" or "pure" not "applied or "practical."	77	5	18
3.	**SRT**	4.	Improving the advising, directing, or supervising of doctoral students.	0	0	100
5.	**T**	5.	Requiring doctoral students acquire writing skills before they write their theses.	6	5	89
2.	**S**	6.	Defining the reason for, the extent of, and the method of mandatory/required study/courses.	5	27	68
4.	**T**	7.	Clarifying the standards for preparing and evaluating the doctoral thesis.	2	6	92
9.	**T**	8.	Decreasing the time allowed to write the thesis.	47	27	27
8.	**T**	9.	Approving alternatives to the traditional thesis [e.g., a book or journal articles].	47	12	41
7.	**S**	10.	Increasing the emphasis placed on the study of research methods.	3	18	79
10.	**SRT**	11.	Permitting and facilitating the attainment of all components of the degree by part-time students.	26	12	62

[cont.]

Appendix Q [cont.]

COMPONENT			PROGNOSIS		
ISSUE	QU	ACTION	-VE	NE	+VE
6. **R**	12.	Ensuring all doctoral students receive a stipend and/or funds to conduct their research.	5	12	83
11. **T**	13.	Requiring the written thesis be shorter than the existing norm [i.e., fewer pages].	30	33	36
14. **SRT**	14.	Decreasing the time allowed to complete all components of the degree.	43	29	28
15. **R**	15.	Accepting "creative" approaches to research [i.e., novel in lieu of traditional approaches].	29	15	55
13. **S**	16.	Approving interdisciplinary study.	3	15	82
19. **S**	17.	Incorporating teacher training into the degree [i.e., teaching doctoral students how to teach].	20	20	61
16. **R**	18.	Approving group or team research [i.e., thesis research conducted by more than one student].	42	12	46

* **S** Issue related to lengthy study component of Ph.D. degree
R Issue related to original research component of Ph.D. degree
T Issue related to thesis preparation component of Ph.D. degree
** Corresponds with problematic issue listed in Table 4
# -VE means negative, NE means no effect, +VE means positive
## Frequency of response percentage as listed in Table 5

Appendix R: A.A.U. doctoral education recommendations

TEACHING BY GRADUATE STUDENTS

"Departments and programs should assure that their graduate students receive instruction in teaching methods, with assessments and feedback on teaching performance and, if possible, with a progression of increasingly advanced teaching experiences including significant in-class teaching.

Department and programs which do not require teaching should review the objectives of their graduate programs and seriously ask themselves why some teaching should not be required of all students.

Universities should limit the number of terms graduate students are permitted to teach; other sources of [financial] support should be sought for students who have reached that limit.

Course sections should never be offered when the principal justification is to provide financial support for graduate students."

RESEARCH

"Graduate students should be encouraged to begin early to learn the research and scholarly techniques of their discipline, and to begin preparing for and carrying out dissertation research as early as possible; faculty should not permit students' research to prolong unnecessarily the time-to-degree.

Research assistanceships should maintain a dual purpose of supporting the conduct of research and of providing students with instruction and financial support.

Departments and interdisciplinary programs in the humanities and related disciplines should develop ways for faculty to involve their students actively and early in research projects or comparable initiatives that will provide apprenticeship research training analogous to that provided in the natural science and engineering fields.

Departments and programs should develop mechanisms such as research seminars, laboratory work, and student-advisor consultations that lead to the timely development of dissertation topics.

Advisors must assume more reponsibility in certifying that the dissertation topic is a realistic project that can be completed in a reasonable time; departments may wish to consider establishing a recommended upper limit to the length of the dissertation; in the cases where a dissertation of exceptional scope is being considered, the advisors should make certain that the student is making a fully informed choice.

[cont.]

Appendix R [cont.]

Universities and departments should make every effort to assure that students have sufficient financial support to permit full-time attention to their dissertations once the work is in its final phase.

Departments should consider organizing seminars or other appropriate group discussions which provide feedback to students working on their dissertations.

Graduate schools should work with departments and programs to develop effective procedures for monitoring the progress of students working on their dissertations; this might be accomplished by use of progress reports during the dissertation stage, generated by or shared with the student, which could be submitted annually by the faculty advisor to the Department Chair and forwarded to the Dean of the Graduate School.

University administrators should review the number and use of postdoctoral fellows to assure their effective incorporation into the missions of the university."

FACULTY TEACHING AND MENTORING

"Departments should establish explicit expectations and enforce explicit requirements for those faculty who advise graduate students.

All graduate students should have a designated faculty advisor at all stages of their programs and should be made aware of the importance of a careful choice of the dissertation advisor.

Institutions and departments should recognize and appropriately reward the full range of faculty teaching and advising of graduate students.

The schedules of anticipated faculty leaves and absences should be publicized within the graduate student community, and departments should assure the continuity of advising during absences as well as a known schedule for the teaching of "key" graduate courses.

Faculty advisors should assist students to:

select coursework that matches the students' needs and interests, and recognize that curricular options which broaden academic experience may also extend the length of the graduate program;

participate early in seminars, laboratory work, or other activities that engage students in research and assist them in the expeditious development of dissertation topics;

[cont.]

define dissertation topics of realistic scope that can demonstrate a student's ability to make independent contributions to the field without encouraging projects of excessive magnitude, requiring several years to complete;

develop a clear sense of professional responsibility and ethical standards of conduct in teaching, research, and scholarship."

CURRICULUM

"New courses should be appropriately integrated rather than simply added to the existing curriculum; where possible, new courses and seminars should displace other components of the curriculum. The addition of new courses and the emergence of new subfields will require periodic redifinition by the faculty of what constitutes the coherent core of the discipline.

Course requirements should provide sufficient flexibility to match coursework to expected career paths, while assuring that all students receive the breadth of learning necessary for a comprehensive grasp of the discipline.

Students should be adequately advised about preparation for qualifying examinations; the examinations should not be so open-ended that students are driven into excessive coursework in preparation for them."

EVALUATING STUDENT PROGRESS AND PERFORMANCE

"Departments should develop and publicize, along with curricular requirements, realistic expectations for performance, including norms for time-to-candidacy and time-to-degree.

Departments should require a written assessment of performance at the end of a student's first year, and should conduct an annual review or some other form of formal evaluation of progress throughout the student's program; such assessments might be prepared by students or their advisors but should be shared with both; appropriate actions should be taken on the basis of these assessments to bring actual and expected performance into accord.

Universities should have explicit, well-publicized dismissal and appeal procedures."

[cont.]

Appendix R [cont.]

FUNDING FOR DOCTORAL STUDY

"The form such [financial] support takes can have a profound effect on students' progress through their programs...[r]ecent data indicate that, of those who complete their dissertations, students supported on fellowships, traineeships, and research assistanceships have the shortest time-to-degree. Students supported on teaching assistanceships take longer to complete their degrees, and students supported by loans and personal income have the longest time-to-degree. Some combination of grants and assistanceships which include teaching would provide optimal support over the course of doctoral study; a careful analysis is needed to identify the optimal combinations by field. Nevertheless, doctoral study in virtually all disciplines is underfunded, and we strongly endorse the recommendations for expanded federal support for doctoral study made by the Association of American Universities and other organizations and individuals. Although we recognize the financial constraints on universities, we also urge university administrators to increase support of doctoral study, particularly at such critical junctures as the dissertation stage."

Source: Association of American Universities (1990, pp.5-18)

REFERENCES

REFERENCES

Adams, C.K. (1887). University education in the United States. Canada Educational Monthly. April, 131-135; September, 268-273.

Amara, R. (1976). Education for survival. Phi Delta Kappan. 58[1], 91-98.

Andersen, D.G. (1983). Differentation of the Ed.D. and Ph.D. in education. Journal of Teacher Education. XXXIV[3], 55-58.

Anderson, R.C. (1984). Some reflections on the acquisition of knowledge. Educational Researcher. 15[9], 5-10.

Apps, J.W. (1988). Higher Education in a Learning Society: Meeting New Demands for Education and Training. San Francisco: Jossey-Bass.

Archer, E.A. (1990). Commonwealth Universities Yearbook 1990. London: Association of Commonwealth Universities.

Arthur, A.J. (1989). Personal correspondence from Principal Librarian, Baillieau Library, University of Melbourne, September 6.

Ash, E.A., Clarkson, B.L., Hanham, H.J., Harrison, D., Page, E.S. (1988). The British Ph.D.. London: Committee of Vice-Chancellors and Principals of the Universities of the United Kingdom.

Asher, H. (1984). The research process. In Asher, H., Weisberg, H.F., Kessel, J.H., Shively, W.P. [Eds.]. Theory-Building and Data Analysis in the Social Sciences. Nashville: University of Tennessee Press. 3-20.

Association for Institutional Research. (1989). Higher Education and the Future [Forum]. Baltimore; April 30 - May 03.

Association of American Universities. (1990). Institutional Policies to Improve Doctoral Education. Washington: Assoc. of American Universities.

Atkinson, C. (1939). True Confessions of a Ph.D. and Recommendations for Reform. Boston: Meador.

Bachetti, R.F. (1977). In praise of good questions. In Adams, C. [Ed.]. Appraising Information Needs of Decision Makers [New Directions for Institutional Research, Number 15]. San Francisco: Jossey-Bass. 11-18.

Bailey, S. (1989). Personal correspondence from Archivist, Bodelian Library, University of Oxford, September 18.

Banki, I.S. (1986). Dictionary of Administration and Management. Los Angeles: Systems Research Institute.

Barbour, I.G. (1974). Myths, Models, and Paradigms. London: SCM Press.

Barrington, G.V. (1986). The Delphi as a naturalistic evaluation tool. Canadian Journal of Program Evaluation. 1[2], 81-88.

Barsoux, J.-L. (1988). The art of the soluble. The Times Higher Education Supplement. October 14, 17.

Becher, T. (1981). Towards a definition of disciplinary cultures. Studies in Higher Education. 6[2], 109-122.

Ben-David, J. (1977). Centres of Learning. New York: McGraw-Hill.

Bent, H.E. (1959). Professionalization of the Ph.D. degree. Journal of Higher Education. XXX[3], 140-145.

Berelson, B. (1960). Graduate Education in the United States. New York: McGraw-Hill.

Bestor, D.K. (1982). Aside From Teaching What in the World Can You Do?. Seattle: University of Washington.

Blackett, The Lord. (1969). Thoughts on the Ph.D. Degree. [Presidential Address, Royal Society Anniversary Day]. London: Royal Society.

Bladen, V.W. (1962). Comments. In Dunton, D., Patterson, D. [Eds.]. Canada's Universities in a New Age [Conference Proceedings, Canadian Universities and Colleges; November, 1961]. Ottawa: Le Droit. 51-57.

Bonneau, L.-P., Corry, J.A. (1972). Quest for the Optimum: Research Policy in the Universities of Canada. Ottawa: Association of Universities and Colleges of Canada.

Bowen, H.R., Schuster, J.H. (1986). American Professors: A National Resource Imperiled. New York: Oxford University Press.

Bowen, W.G., Sosa, J.A. (1989). Prospects for Faculty in the Arts and Sciences. Princeton: Princeton University Press.

Braddock, D. (1987). The Ph.D. degree. In Bureau of Labor Statistics. [Ed.]. Outlook for College Graduates and Ph.D.s. Washington: Department of Labor. 1-11.

Brodbeck, M. (1969). Models, meaning, and theories. In Brodbeck, M. [Ed.]. Readings in the Philosophy of the Social Sciences. London: Macmillan. 579-600.

Buckley, P.J., Hooley, G.J. (1988). The non-completion of doctoral research in management. Educational Research. 30[2], 110-119.

Campbell, R.F. (1957). Situational factors in educational administration. In Campbell, R.F., Gregg, R. [Eds.]. Administrative Behavior in Education. New York: Harper. 228-268.

Campbell, R.F. (1986). Is educational administration a special case: The question revisited. In Johnston, G.S. [Ed.]. Research and Thought in Administrative Theory. Lanham: University Press of America.

Carnegie Commission on Higher Education. (1971). Less Time, More Options. New York: McGraw-Hill.

Carnegie Foundation for the Advancement of Teaching. (1976). The State and Higher Education. San Francisco: Jossey-Bass.

Carter, C. (1980). Higher Education for the Future. Oxford: Basil Blackwell.

Centra, J.A., Kuykendall, N.M. (1974). Women, Men, and the Doctorate. Princeton: Educational Testing Service.

Chambers, M.M. (1950). Universities of the World Outside USA. Washington: American Council on Education.

Chambers, M.M. (1976). Keep Higher Education Moving. Danville: Interstate Printers and Publishers.

Chapanis, A. (1967). Men, machines, and models. In Marx, M.H. [Ed.]. Theories in Contemporary Psychology. New York: Macmillan. 104-129.

Christopherson, D., Boyd, R.L., Fleming, I., Macdonald, I.G., Mylroi, M.G., Wardlaw, A.C., Willmott, J.C. (1983). Research Student and Supervisor. Swindon: Science and Engineering Research Council [United Kingdom].

Clarke, S.C., Coutts, H.T. (1971). The Future of Teacher Education. Edmonton: Faculty of Education, University of Alberta.

Coates, J.F. (1975). In defense of Delphi. Technological Forecasting and Social Change. 7, 193-194.

Cobban, A.B. (1975). The Mediaeval Universities: Their Development and Organization. New York: Methuen.

Commission on Non-Traditional Study. (1975). Diversity by Design. San Francisco: Jossey-Bass.

Committee for International Co-operation in Higher Education. (1987). The British Ph.D. and the Overseas Student. London: British Council.

Committee for International Co-operation in Higher Education. (1989). The British Ph.D.. London: British Council.

Cookson, P.S. (1986). Charting the unknown: Delphi and Policy Delphi strategies for international co-operation. International Journal of Lifelong Education. 5[1], 3-13.

Corwin, R.G., Lane, W.R., Monahan, W.G. (1975). The nature of theory. In Monahan, W.G. [Ed.]. Theoretical Dimensions of Educational Administration. New York: Macmillan. 73-104.

Coulton, G.G. (1913). Universities. In Monroe, P. [Ed.]. A Cyclopedia of Education. New York: Macmillan. 651-663.

Council of Graduate Schools. (1977). The Doctor of Philosophy Degree. Washington: Council of Graduate Schools.

Council of Graduate Schools. (1990). The Doctor of Philosophy Degree. Washington: Council of Graduate Schools.

Council of Graduate Schools. (1991). The Role and Nature of the Doctoral Dissertation. Washington: Council of Graduate Schools.

Courtenay, B.C. (1988). Eliminating the confusion over the Ed.D. and Ph.D. in colleges and schools of education. Innovative Higher Education. 13[1], 11-20.

Coyle, S.L., Thurgood, D.H. (1989). Summary Report 1987: Doctorate Recipients From United States. Washington: National Academy Press.

Cross, K.P. (1987). The changing role of higher education in the United States. Higher Education Research. 6[2], 99-108.

Crosson, P.H., Nelson, G.M. (1986). A profile of higher education doctoral programs. The Review of Higher Education. 9[3], 355-357.

Cude, W. (1987). The Ph.D. Trap. West Bay [Nova Scotia]: Medicine Label Press.

Cyphert, W.W., Gant, W.L. (1970). The Delphi technique: A case study. Phi Delta Kappan. 52, 272-273.

Dalkey, N.C. (1967). Delphi. Santa Monica: RAND Corporation.

Dalkey, N.C. (1969). The Delphi Method. Santa Monica: RAND Corporation.

Dalkey, N.C. Helmer, O. (1962). An experimental application of the Delphi method to the use of experts. Management Science. 9, 458-467.

Davies, L.W. (1972). Federal policies for industries and development in Australia. Search. 3, 423-426.

Dejnozka, E.L. (1983). Educational Administration Glossary. London: Greenwood.

Denzin, N.K. (1988). Triangulation. In Keeves, J.P. [Ed.]. Educational Research, Methodology, and Measurement: An International Handbook. Oxford: Pergamon Press. 511-513.

Dewey, J. (1913). Theory and practice. In Monroe, P. [Ed.]. A Cyclopedia of Education. New York: Macmillan. 606-607.

Dewey, J. (1917). Proceedings and Addresses, Annual Meeting, Association of American Universities [November 9,10, 1917, Iowa State University]. Washington: Association of American Universities.

Dewey, J. (1933). How We Think: A Restatement of the Relation of Reflective Thinking to the Educative Process. Boston: D.C. Heath.

Dill, D.D., Morrison, J.L. (1985). Ed.D. and Ph.D. research training in the field of higher education: A survey and a proposal. The Review of Higher Education. 8[2], 169-186.

Donald, J.G. (1983). Knowledge structures: Methods for exploring course content. Journal of Higher Education. 54[1], 31-41.

Doyle, F.J. (1974). How to Design, Structure, and Perform a Delphi Study. Ottawa: Department of Industry, Trade, and Commerce.

Dressel, P.L., Mayhew, L.B. (1974). Higher Education as a Field of Study. San Francisco: Jossey-Bass.

Durant, W. (1935). The Story of Civilization [Part I]. New York: Simon and Schuster.

Durant, W. (1939). The Story of Civilization [Part II]. New York: Simon and Schuster.

Durant, W. (1950). The Story of Civilization [Part IV]. New York: Simon and Schuster.

Durant, W. (1957). The Story of Civilization [Part VI]. New York: Simon and Schuster.

Durant, W., Durant, A. (1975). The Story of Civilization [Part XI]. New York: Simon and Schuster.

Encel, S. (1965). The social role of higher education. In Wheelwright, E. [Ed.]. Higher Education in Australia. Canberra: F.W. Cheshire. 1-32.

Evangelauf, J. (1989). Lengthening of time to earn a doctorate causes a concern. The Chronicle of Higher Education. March 15, A1,A13.

Fazio, L.S. (1985). The Delphi. Assessment and Evaluation in Higher Education. 10[2], 147-158.

Fiorina, M.P. (1984). Formal models in political science. In Asher, H.B., Weisberg, H.F., Kessel, J.H., Shively, W.P. [Eds.]. Theory-Building and Data Analysis in the Social Sciences. Nashville: University of Tennessee Press. 67-94.

Fisher, S. (1987). Burning out the best. The Times Higher Education Supplement. April 3, 13.

Francis, R.G. (1961). The Rhetoric of Science. Minneapolis: University of Minnesota Press.

Frost, S.B. (1967). The Ph.D. degree. McGill University Bulletin of Educational Procedures [Number 11]. February.

Garcia, M.E. (1987). Preventing the "All But Thesis" Phenomenon [Doctoral Dissertation, Number 8721478]. Ann Arbor: University Microfilms International.

Gerson, M. (1989). Shortage of new Ph.D.s is forseen for universities. The Chronicle of Higher Education. May 3. A40.

Gold, K. (1988). Researchers 'need new skills for jobs market'. The Times Higher Education Supplement. January 15, 7.

Good, C.V. (1973). Dictionary of Education. New York: McGraw-Hill.

Gordon, T.J., Hayward, H. (1968). Initial experiments with the cross impact matrix method of forecasting. Futures. 1[2], 1-14.

Gordy, J.P. (1891). Chairs of pedagogy. Canada Educational Monthly. March, 93-98.

Gouldner, A.W. (1957). Cosmopolitans and locals: Toward an analysis of latent social roles. Administrative Science Quarterly. 2[3], 281-306.

Graves, D. (1983). Judgements of graduate deans and their reports regarding foreign language requirements for the Ph.D.. ADFL Bulletin. 15[2], 37-39.

Gravesande, D. (1990). Books in Print 1990-1991. New York: R.R. Bowker.

Green, C. (1977). Degrees, diplomas and certificates. In Knowles, A.S. [Ed.]. The International Encyclopedia of Higher Education [Volume 4]. San Francisco: Jossey-Bass. 1230-1241.

Griffiths, D.E. (1988). Administrative theory. In Boyan, N.J. [Ed.]. Handbook of Research of Educational Administration. New York: Longman. 27-51.

Grolier Society. (1983). Australian Encyclopedia [Volume 10]. Melbourne: Grolier Society.

Groneman, C., Lear, R.N. (1985). Corporate Ph.D.: Making the Grade in Business. New York: Facts on File. [as cited in Lynton and Elman (1987)].

Guba, E.S. (1981). Criteria for assessing the trustworthiness of naturalistic inquiries. Educational Communication and Technology Journal. 29, 75-92.

Guba, E.S., Lincoln, Y.S. (1989). Fourth Generation Evaluation. London: Sage.

Hacke, J.E. (1968). Anticipating socioeconomic consequences of a major technological innovation. In United States Air Force Office of Aerospace Research [Ed.]. Long Range Forecasting Methodology. Springfield: Clearing House for Scientific and Technical Information. 131-146.

Halpin, A.W. (1960). Ways of knowing. In Campbell, R.F., Lipham, J.M. [Eds.]. Administrative Theory As a Guide to Action. Chicago: University of Chicago. 3-20.

Halpin, A.W. (1966). Theory and Research in Administration. New York: Macmillan.

Halstead, B. (1987). The Ph.D. system. Bulletin of the British Psychological Society. 40, 99-100.

Hamilton, R.G., Casarett, A.P., Horowitz, F.D., Koenigsknecht, R.A., Lawrence, F.L., Maclachlan, G., Perkins, F.E., LaPidus, J.B. (1989). Working Paper for the CGS Study of the Role and Nature of the Doctoral Dissertation. Washington: Council of Graduate Schools.

Hammersley, M. (1987). Some notes on the terms "validity" and "reliability." British Educational Research Journal. 13[1], 73-81.

Harmon, L.R. (1978). A Century of Doctorates: Data Analyses of Growth and Change. Washington: National Academy of Science.

Harris, R.S. (1976). A History of Higher Education in Canada, 1163-1960. Toronto: University of Toronto Press.

Helmer, O. (1966). The Use of the Delphi Technique in Problems of Educational Innovations. Santa Monica: RAND Corporation.

Helmer, O. (1968). Analysis of the future. In Bright, J. [Ed.]. Technological Forecasting for Industry and Government. Englewood Cliffs: Prentice-Hall. 116-143.

Helmer, O. (1983). Looking Forward: A Guide to Futures Research. Beverley Hills: Sage.

Helmer, O., Rescher, N. (1959). On the epistemology of the inexact sciences. Management Science. 6, 25-52.

Henchey, N. (1978). Making sense of future studies. Alternatives. 7[2], 24-28.

Hencley, S.P., Yates, J.R. (1974). Futurism in Education. Berkeley: McCutchan.

Heron, E. (1989). Cambridge blacklisted in purge on Ph.D. completers. The Times Higher Education Supplement. February 3, 1.

Herron, J. (1988). Universities and the Myth of Cultural Decline. Detroit: Wayne State University Press.

Hesseling, P. (1986). The Frontiers of Learning: The Ph.D. Octopus. Dordrecht: Foris.

Heydinger, R.B., Zentner, R.D. (1983). Multiple scenario analysis. In Morrison, J.L., Renfro, W.L., Boucher, W.I. [Eds.]. Applying Methods and Techniques of Futures Research [New Directions for Institutional Research, Number 39]. San Francisco: Jossey-Bass. 51-68.

Higher Education Research and Development Society of Australasia. (1989). Breaking the Mould: An Examination of the Forces Shaping Tertiary Education [Conference, Higher Education and Resarch Development Society of Australasia, Adelaide]. July 01-04.

Hill, S.C., Fensham, P.J., Howden, I.B. (1974). Ph.D. Education in Australia: The Making of Professional Scientists. Canberra: Australian Academy of Science.

Hill, S., Johnston, R. (1984). Postgraduate education towards the year 2000. Higher Education Research and Development. 3[2], 121-135.

Hodges, L. (1991). Women set to win Ph.D. stakes by 2001. The Times Higher Education Supplement. January 25, 11.

Hollis, E.V. (1945). Toward Improving Ph.D. Programs. Washington: American Council on Education.

Holmes, B. (1987). The British Ph.D.. London: Committee of Vice-Chancellors and Principals of the Universities of the United Kingdom.

Howe, K. (1985). Two dogmas of educational research. Educational Research. 14[8], 10-18.

Huckfeldt, V.E. (1972). Imaging future organization in higher education. In Popper, S.H. [Ed.]. Imaging Alterantive Future School Organizations. Minneapolis: University of Minnesota. 11-27.

Hudson, I. (1974). A Bibliography on the Delphi Technique. San Francisco: Council of Planning Librarians.

Hunter, J.H. (1880). The university question. Canada Educational Monthly. January, 1-9.

Husén, T. (1985). Research paradigms in education. In Husén, T., Postlethwaite, T.,N. [Eds.]. The International Encyclopedia of Education Research and Studies. Oxford: Pergamon Press. 4,335-4,338.

Hutchins, R.M., Adler, M.J. (1969). The idea of the university in the nineteenth century. In Hutchins, R.M., Adler, M.J. [Eds.]. Great Ideas Today. New York: Encyclopedia Britannica. 346-355.

Jacobsen, R.L. (1989). Educators and politicians from 100 countries urge campaign to make higher education more useful. The Chronicle of Higher Education. January 25, A1,A37.

James, W. (1903). The Ph.D. octopus. The Harvard Monthly. XXXVI[1], 7.

James, W. (1911). Memories and Studies. New York: Longmans Green.

Johnston, D.F. (1970). Forecasting methods in the social sciences. Technological Forecasting and Social Change. 2, 173-187.

Johnston, D.F. (1972). Social indicators and social forecasting. In Popper, S.H. [Ed.]. Imaging Alternative Future School Organizations. Minneapolis: University of Minnesota. 45-55.

Judd, R.C. (1972). Forecasting to consensus gathering: Delphi grows up to college needs. College and University Business. 51, 35-43.

Kaplan, A. (1964). The Conduct of Inquiry. San Francisco: Chandler.

Keeves, J.P. (1988). Models and model building. In Keeves, J.P. [Ed.]. Educational Research, Methodology, and Measurement: An International Handbook. Oxford: Pergamon Press. 559-565.

Kerr, C. (1963). The Uses of the University [Godkin Lectures, Harvard University]. Cambridge: Harvard University Press.

Kerr, C. (1971). Less Time, More Options [Conference Proceedings]. Atlanta: Southern Regional Educational Board.

Kerr, C. (1975). Higher education in the United States in 1980 and 2000: From the perspective of the Carnegie Commission. In Hostrop, R.W. [Ed.]. Education Beyond Tomorrow. Homewood: ETC Publications. 69-96.

Kirschling, W.R., Huckfeldt, V.E. (1980). Projecting alternative futures. In Jedamus, P., Peterson, M.W. [Eds.]. Improving Education Management. San Francisco: Jossey-Bass. 200-215.

Kogan Page. (1985). A Comprehensive Guide to Educational, Technical, Professional and Academic Qualifications in Britain. London: Kogan Page.

Kowalski, R. (1987). Slow Ph.D.s. The Times Higher Education Supplement. December 25, 10.

Lachman, R. (1967). The model in theory construction. In Marx, M.H. [Ed.]. Theories in Contemporary Psychology. New York: Macmillan. 78-89.

Law, H. (1970). Strong medicine for scientists' plethora of Ph.D.s. Canadian University and College. 5[10], 29-31.

Leinster-Mackay, D.P. (1977). The idea of a university: A historical perspective on some precepts and practice. Vestes. 20[3-4], 28-33.

Leitner, B.W., Myers, B.C., Chang, T., Sardeson, K., Keller P.F.G. (1979). A Study of Factors That Influence Response Rate Using a Questionnaire on Questionnaires [Paper, Annual Meeting, American Educational Research Association]. April.

Levy, P.S. (1982). Surviving in a predominantly white male institution. In Vartuli, S. [Ed.]. The Ph.D. Experience: A Woman's Point of View. New York: Praeger Scientific. 45-60.

Lincoln, Y.S. Guba, E.G. (1985). Naturalistic Inquiry. London: Sage.

Linstone, H.A. (1978). The Delphi technique. In Fowles, J. [Ed.]. Handbook of Futures Research. Westport: Greenwood. 273-300.

Linstone, H.A., Turoff, M. (1975). Introduction. In Linstone, H,A., Turoff, M. [Eds.]. The Delphi Method: Techniques and Applications. Reading: Addison-Wesley. 3-12.

Lockmiller, D.A. (1971). Degrees, academic. In Deighton, L.C. [Ed.]. The Encyclopedia of Education. New York: Macmillan and Free Press. 25-32.

Lonsdale, A.J. (1975). Educational planning and the Delphi technique. Educational Research and Perspectives. 2[2], 3-13.

Louden, J. (1902). The universities in relation to research [Presidential Address]. In Proceedings [Appendix A], Royal Society of Canada.

Lynton, E.A., Elman, S.E. (1987). New Priorities for the University. San Francisco: Jossey-Bass.

Maclachlan, G. (1987). On the Time Taken to Complete Graduate Research Degrees. Ottawa: Canadian Association of Graduate Schools.

Malaney, G.D. (1988). Graduate education as an area of research in the field of higher education. In Smart, J.C. [Ed.]. Higher Education: Handbook of Theory and Research [Volume IV]. New York: Agathon Press. 397-454.

Martino, J. (1971). Examples of technological trend forecasting for research and development planning. Technological Forecasting and Social Change. 2, 247-260.

Marx, M.H. (1976). Formal theory. In Marx, M.H., Goodson, F.E. [Eds.]. Theories in Contemporary Psychology. New York: Macmillan. 234-260.

Maslen, G. (1989). Australia faces big faculty shortage in next five years. The Chronicle of Higher Education. May 3, A40.

Massué, J.-P., Schinck, G. (1987). Doctoral training in Europe. Higher Education in Europe. XII[4], 56-67.

Mayhew, L.B. (1977). Graduate and professional education. In Knowles, A.S. [Ed.]. The International Encyclopedia of Higher Education [Volume 5]. San Francisco: Jossey-Bass. 1,905-1,915.

McConnell, T.R. (1963). Needed: Research in College and University Organization and Administration in the Study of Academic Organizations. Boulder: Western Interstate Commission on Higher Education.

McCracken, D.D. (1968). The Monto Carlo method. In Scientific American [Ed.]. Mathematical Thinking in the Behavioral Sciences. San Francisco: Jossey-Bass.

McGrath, J.H. (1974). Relevance trees. In Hencley, S.P., Yates, J.R. [Eds.]. Futurism in Education. Berkeley: McCutchan. 71-96.

McGraw, B., Browne, R.K., Rees P. (1976). Delphi in education: Review and assessment. Australian Journal of Education. 20[1], 59-76.

McLean, T. (1981). The Black Female Ph.D.. Washington: University Press of America.

McNeal, J., Hodysh, H.H., Konrad, A.G. (1981). University Purposes [Report prepared for the History Committee of the University of Alberta Senate Commission on University Purpose]. Edmonton: University of Alberta.

Mills, J., Dombra, I. (1968). University of Toronto Doctoral Theses: 1897-1967. Toronto: University of Toronto Press.

Mitchell, A.G. (1959). The university faculties. In Price, A.G. [Ed.]. The Humanities in Australia. Sydney: Angus and Robertson. 56-98.

Monaghan, P. (1989). Some fields are reassessing the value of the dissertation. The Chronicle of Higher Education. March 29, A1,A16.

Monroe, P. (1911). A Cyclopedia of Education [Volume 2]. New York: Macmillan.

Monroe, P. (1912). A Cyclopedia of Education [Volume 3]. New York: Macmillan.

Mooney, C.J. (1989). Uncertainity is rampant as colleges begin to brace for faculty shortage expected to begin in 1990s. The Chronicle for Higher Education. January 25, A14,A16,A17.

Moore, R.W. (1985). Winning the Ph.D. Game. New York: Dodd Mead.

Morris, W. (1975). Heritage Illustrated Dictionary of the English Language [International Edition]. New York: McGraw-Hill.

Morrison, J.L. (1990). Global Change: Implications for the Future of Higher Education [International Newsletter Number 13]. Guildford: Society for Research into Higher Education and Personal Research Incorporated.

Moses, I. (1984). Supervision of higher degree students. Higher Education Research and Development. 3[2], 153-165.

Nadeau, G.G., Donald, J.G., Konrad, A., Tremblay, L. (1989). Critères et Indicateurs de Qualité et D'Excellence dans les Collèges et les Universités du Canada / Criteria and Indicators of Quality and Excellence in Canadian Colleges and Universities [Delphi study in progress]. Moncton: Université de Moncton.

Nash, N. (1978). Delphi and Educational Research: Review and Assessment. Washington: Educational Resources Information Center.

National Science Foundation. (1989). the Top 100 Institutions in Total Research and Development Spending for Fiscal 1988. Washington: National Science Foundation.

Neilson, W.A., Gaffield, C. (1986). Universities in Crisis: A Mediaeval Institution in the Twenty-First Century. Halifax: Institute for Research on Public Policy.

Nichols, R.F. (1967). A reconsideration of the Ph.D.. Graduate Journal. 7[2], 325-335.

Nordvall, R.C. (1982). The Process of Change in Higher Education Institutions [AAHE-ERIC Higher Education Research Report No. 7]. Washington: American Association for Higher Education.

Patton, M.Q. (1990). Qualitative Evaluation and Research Methods. London: Sage Publications.

Paulsen, F. (1908). German Education. London: T. Fisher Unwin.

Perica, L.M. (1990). World Organization for the Future of Higher Education. In Morrison, J.L. [Ed.]. Global Change: Implications for the Future of Higher Education [International Newsletter Number 13]. Guildford: Society for Research into Higher Education and Personal Research Incorporated. 20-22.

Peterson, M.W. (1974). Organization and administration in higher education: Sociological and social-psychological perspectives. In Kerlinger, F.N., Carroll, J.B. [Eds.]. Review of Research in Education. Itasca: F.E. Peacock Publishers. 296-347.

Phillips, E.M., Pugh, D.S. (1987). How to Get a Ph.D.. Milton Keynes: Open University Press.

Pill, J. (1971). The Delphi method: Substance, context, a critique, and an annotated bibliography. Socio-Economic Planning Science. 5, 57-71.

Polak, F.L. (1971). Prognostics. New York: Elsevier Publishing Company.

Popper, S.H. (1971). The Simulation of a School of the Future. Minneapolis: University Council for Educational Administration.

Porter, J. (1970). Post-Industrialism, Post-Nationalism, and Post-Secondary Education [National Seminar Proceedings, June 1970]. Ottawa: Institute of Public Administration of Canada.

Porter, J., Blishen, B., Evans, J.R., Hansen, B.L., Harris, R.S., Ireland, F., Jewett, P., Macdonald, J.B., Ross, R., Trotter, B., Willis, R.B. (1971). Towards 2000. Toronto: McClelland and Stewart.

Powles, M. (1988). Know Your Ph.D. Students and How to Help Them. Melbourne: University of Melbourne.

Rait, R.S. (1912). Life in the Mediaeval University. Cambridge: Cambridge University Press.

Rashdall, H. (1936). The Universities of Europe in the Middle Ages [Volume I]. Oxford: Clarendon Press.

Reeves, M. (1988). The Crisis in Higher Education. Milton Keynes: Open University Press.

Renouf, J. (1989). An alternative Ph.D.. Area. 21[1], 87-92.

Repo, M. (1970). Who Needs the Ph.D.? Toronto: University of Toronto Graduate Students' Union.

Richards, H. (1991). Blacklisting remedy works for late theses. The Times Higher Education Supplement. January 18, 5.

Robbins Commission. (1963). Higher Education Report. London: Her Majesty's Stationery Office.

Rosenhaupt, H., Pinch, J. (1971). Doctoral degrees. In Deighton, L.C. [Ed.]. The Encyclopedia of Education. New York: Macmillan and Free Press. 117-123.

Rosovsky, H. (1990). The University: An Owner's Manual. London: W.W. Norton.

Ross, M.G. (1976). The University: The Anatomy of Academe. New York: McGraw-Hill.

Ross, P.N. (1975). The establishment of the Ph.D. at Toronto. In Katz, M.B., Mattingly, P.H. [Eds.]. Education and Social Change. New York: New York University Press. 193-214.

Royce, J.R. (1964). The Encapsulated Man. New York: D. Van Nostrand.

Rudd, E. (1985). A New Look at Postgraduate Failure. Guildford: The Society for Research into Higher Education.

Rudd, E., Simpson, R. (1975). The Highest Education. London: Routledge and Kegan Paul.

Russell, The Earl. (1988). Unknowns that limit Ph.D. completion. The Times Higher Education Supplement. February 26, 12.

Sackman, H. (1974). Delphi Assessment. Santa Monica: RAND Corporation.

Salk, J. (1990). Ulrich's International Periodical Directory [1990-1991]. New York: R.R. Bowker.

Sartain, W.J. (1955). The university and research: The establishment of the Ph.D. degree. The Cambridge Review. April 30, 482,483,485.

Schachner, N. (1962). The Mediaeval Universities. New York: A.S. Barnes.

Scheibe, M., Skutsch, M., Schofer, J. (1975). Experiments in Delphi methodology. In Linstone, H.A., Turoff, M. [Eds.]. The Delphi Method: Techniques and Applications. Reading: Addison-Wesley. 262-287.

Schmitt, S.A. (1969). Measuring Uncertainty: An Elementary Introduction to Bayesian Statistics. Reading: Addison-Wesley.

Science and Technology Committee. (1986). University Post-Graduate Training. Ottawa: Canadian Manufacturers' Association.

Scott, P. (1984). The Crisis of the University. London: Croom Helm.

Scott, P. (1988). Saving the Ph.D.. The Times Higher Education Supplement. April 15, 44.

Scott, P. (1989). Sitting out the quickstep. The Times Higher Education Supplement. July 14, 7.

Sekhon, J.G. (1989). Ph.D. education and Australia's industrial future. Higher Education Research and Development. 8[2], 191-215.

Seymour, D.T. (1987). Out on a limb: Why administrators must take risks. Educational Record; 68[2], 36-40.

Seymour, D.T. (1988). Developing Academic Programs: The Climate for Innovation [ASHE-ERIC Higher Education Report Number 3]. Washington: Association for the Study of Higher Education.

Shane, H.G. (1973). The Educational Significance of the Future. Bloomington: Phi Delta Kappan.

Shores, L. (1961). Collier's Encyclopedia [Volume 1]. New York: Crowell-Collier.

Simpson, R. (1983). How the Ph.D. Came to Britain. Guildford: Society for Research into Higher Education.

Slosson, E.E. (1910). Great American Universities. New York: Macmillan.

Smith, K.A. (1989). Personal correspondence from University Archivist, University of Sydney, September 5.

Smith, P. (1990). Killing the Spirit. New York: Penguin Group.

Somers, K., Baker, G., Isbell, C. (1984). How to use the Delphi technique to forecast training needs. Performance and Instruction Journal. May, 26-28.

Spurr, S.H. (1970). Academic Degree Structures. New York: McGraw-Hill.

Squair, J. (1904). Lessons from lost opportunities. University of Toronto Monthly. October, 10.

Sternberg, D.J. (1981). How to Complete and Survive a Doctoral Dissertation. New York: St. Martin's Press.

Stine, S.B. (1989). The business of the business. Policy Perspectives. 1[3], 1-7.

Storr, R.F. (1973). The Beginning of the Future. New York: McGraw-Hill.

Stranks, D.R. (1984). Ph.D. education in the nineties. Higher Education Research and Development. 3[2], 167-175.

Surridge, O. (1989). New Yorker calls for thesis to be dropped from Ph.D.s. The Times Higher Education Supplement. January 20, 2.

Swann, M. (1968). The Flow Into Employment of Scientists, Engineers and Technologists. London: Her Majesty's Stationery Office.

Sykes, C. J. (1988). ProfScam [sic]. Washington: Regnery Gateway.

Symons, T.H., Page, J.E. (1984). Some Questions of Balance [Volume 3]. Ottawa: Association of Universities and Colleges of Canada.

The Chronicle of Higher Education. (1988). Almanac. Washington: The Chronicle of Higher Education.

Thompson, I., Roberts, A. (1985). The Road Retaken: Women Reenter the Academy. New York: The Modern Language Association of America.

Thurgood, D.H., Weinman, J.M. (1990). Summary Report 1989: Doctorate Recipients From United States Universities. Washington: National Academy Press.

Thwing, C.F. (1928). The American and the German University. New York: Macmillan.

Toffler, A. (1974). The psychology of the future. Law in American Society. 3[4], 17-23.

Travers, R.M. (1969). An Introduction to Educational Research. New York: Macmillan.

Turoff, M. (1975). The policy Delphi. In Linstone, H.A., Turoff, M. [Eds.]. The Delphi Method: Techniques and Applications. Reading: Addison-Wesley. 84-101.

Uhl, N.P. (1983). Using the Delphi technique in institutional planning. In Uhl, N.P. [Ed.]. Using Research for Strategic Planning [New Directions for Institutional Research, Number 37]: San Francisco: Jossey-Bass. 81-94.

Van Dalen, D.B. (1979). Understanding Educational Research. New York: McGraw-Hill.

Vandament, W.E. (1988). Those who would reform undergraduate education must recognize the realities of academic governance. The Chronicle of Higher Education. November 30, A52.

Vartuli, S. (1982). The Ph.D. Experience: A Woman's Point of View. New York: Praeger Scientific.

Veysey, L.R. (1965). The Emergence of the American University. Chicago: University of Chicago Press.

Walters, E. (1965). The rise of graduate education. In Walters, E. [Ed.]. Graduate Education Today. Washington: American Council on Education. 1-29.

Weatherman, R., Swenson, K. (1974). Delphi technique. In Hencley, S.P., Yates, J.R. [Eds.]. Futurism in Education: Methodologies. Berkeley: McCutchan.

Weaver, M.O. (1988). From the beginning. Training and Development Journal. February, 18-23.

Webb, E.J., Campbell, D.T., Schwartz, R.D., Sechrest, L. (1966). Unobtrusive Measures. Chicago: Rand McNally.

Weston, J. (1988a). First joint Ph.D. program pioneers way for others. University Affairs. February, 2,3.

Weston, J. (1988b). Can curriculum be revamped?. University Affairs. November, 40.

Whitaker, J. (1990). Books in Print, 1990. London: J. Whitaker and Sons.

Whitehead, A. (1925). Science and the Modern World. New York: Macmillan.

Wilcox, W. (1975). The university in the United States of America. In Stephens, M.D., Roderick, G.W. [Eds.]. Universities for a Changing World. London: David and Charles. 34-50

Williams, E. (1988). Ph.D. overhaul to compromise on taught courses. The Times Higher Education Supplement. April 8, 1.

Winfield, G. (1987). Doctors fighting with an octopus. The Times Higher Education Supplement. March 27, 15.

Wolfe, D., Kidd, C.V. (1971). The future market for Ph.D.s. Science. 173, 783-793.

Wood, L., Davis, B.G. (1978). Designing and Evaluating Higher Education Curricula [Number 8]. Washington: Educational Resources Information Center.

Worsham, J.P. (1980). Application of the Delphi Method: A Selected Bibliography. Monticello: Vance Bibliographics.

Xerox University Microfilms. (1973). Comprehensive Dissertation Index, 1861-1972. Ann Arbor: Xerox Corporation.

Young, A.H. (1903). The University of Oxford and colonial graduates. The Times. September 19, 7.

Young. K., Fogarty. M.P., McRae, S. (1987). The Management of Doctoral Studies in the Social Sciences. London: Policy Studies Institute.

Zur-Muehlen, M. von. (1978). The Ph.D. dilemma in Canada revisited. Canadian Journal of Higher Education. VIII[2], 49-92.

Zur-Muehlen, M. von. (1987). A faculty supply crisis in the 1990s seems unlikely. University Affairs. March, 17.

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